The Chemical Age

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Development Work in Industry

THE British Chemical Plant Manufacturers' Association has acquired the habit of arranging for highly interesting discussions upon subjects of general importance, these discussions taking the place of set speeches at the annual dinner. It is a custom which might with advantage be pursued by other public bodies. The discussion which was reported in our columns last week centred round the general subject of private research in industry, that is to say, research conducted in the laboratories of business concerns, apart from that of the Research Associations. It was generally accepted that this research did not necessarily involve highly skilled work by specialists, but might consist of no more than development work based on commonsense plus a modicum of scientific knowledge, the result of which was to introduce minor improvements in processes, methods or products.

Dr. Fleming, who introduced the subject, undoubtedly succeeded in leaving the feeling that in this year of grace no manufacturer *dare* neglect research. He illustrated the general subject of research organisation by the experiences of four companies with which he was associated. The advancement of each of these concerns by reason of their research policy has been impressive to a degree. A business that had appeared to Dr. Fleming and to others as stagnant because further development was impossible, was put on an entirely new footing within a short time by the discoveries made when a laboratory was introduced. Another concern which, when Dr. Fleming joined it, was one of many firms in its particular line of business and of no more than average importance among its fellows, has now become the leading firm in Europe in its own industry. The other examples were not less impressive. Dr. Fleming quoted the dictum that " The greatest assets a company possesses are the things it does not know "; while that may be generally true, it is also true that that asset is converted into a liability if an organisation is not set up whereby the unknown things can be discovered and turned to account. It is a liability because competitors are making the discoveries and are thus forging further ahead, while the firm that will not investigate is sinking among the old-fashioned undertakings that are presently destined to disappear. Prestige and inherited skill are never sufficient to permit a firm to hold its own for long against new knowledge.

The problem immediately arises as to how a department of this character is to be initiated. That is an individual problem that each concern must solve for itself. It is a simple problem for a large concern, because funds permit of a staff of research men working in a properly equipped laboratory. A moderate-sized firm may find it desirable to instal a small laboratory, and to work in conjunction with a research association. Dr. Fleming suggested that the smallest firms might be able to do no more than appoint a technical officer who does little or no original work himself, but whose business it is to keep the firm up to date and in touch with what is being done elsewhere.

The particular problem of many of the concerns who manufacture chemical plant was not discussed, however. Many of these concerns are primarily engineers who manufacture chemical plant as an engineering undertaking and not as chemical engineers. The chemical industry is only one of many industries served by these firms; is it considered that they should set up a research organisation? If so, what work would the research men be likely to find awaiting them? These questions can best be answered in the light of experience. It has been found that when a firm of this character happens to come into possession of the services of a chemist, the chemist is usually tolerated with a deal of scepticism, but that sooner or later the value of his work becomes appreciated and the scientific department is extended until it becomes an integral and valuable part of the concern.

There is a caveat to this general principle. Much depends on the man in charge of the scientific department. It is not necessary that he should possess high scientific qualifications; he need not be a first-class honours man with years of post-graduate work in research. Generally a man of this character is primarily suited to the large concerns where specialisation and absorption in research are possible. The research man in a small works, or in a primarily engineering works, must be live, practical, inventive, able to turn his hand to anything, and with a ready eye to the business possibilities of every new development that comes under his notice. As the chemical engineering side of the business grows, he will find himself having to negotiate contracts, to assist and even to supervise the design of the plant, and to operate the plant when it has been installed.

In a word, there is little or no room for the pure research chemist or physicist in the smaller works or in engineering works; sooner or later he will be distinguishable from the other senior officials of his concern only in that he had his early training in chemistry or physics, while they were trained in the engineering shop or the office. Such considerations as these give support to the controversial opinion that the practical-minded and ambitious young chemist is generally better advised to seek employment with a firm of this character than with a large research organisation where he is likely to be buried beneath a weight of knowledge, often of abstract character.

Notes and Comments

Business at the B.I.F.

IT was to be expected that if those dismal utterances which have been made recently regarding the state of trade had been based on a logical foundation, a marked falling-off in the amount of business done at the British Industries Fair would inevitably result. The contrary, however, was the case. The Fair, which closed at the end of last week, has been declared by the majority of exhibitors to be the most satisfactory that has yet been held. Although last year's Fair undoubtedly received additional interest due to the approaching Coronation, the number of home and overseas buyers attending Olympia and Earls Court this year was slightly more than 3,000 in excess of last year's figures. The greatly improved lay-out of the display must have made a contribution to this increase, but it is quite certain that however impressively a trade fair might be presented it would not attract buyers in times when trade is depressed and when no one is prepared to place substantial orders. The Federation of British Industries states that there was a definite increase in the volume of orders placed and general inquiries have also been well up to average.

A Chemical Congress in Peru

ALTHOUGH chemical products account for one of the chief classes of commodities exported by Peru to this country, the local industry is a small one, consisting of six factories producing heavy chemicals and a number of works devoted to soap manufacture and the preparation of medicinal products. One of the objects of the first chemical congress ever to be held in Peru will be the encouragement of study and research in chemistry with the idea of developing native chemical industry. The congress to be held in Lima from July 18 to 23 next is to be organised by a committee on which universities, national engineering and chemical societies, and governmental departments are represented. That the subjects to be discussed at the congress cover a wide field, can be seen from a preliminary list which has been drawn up. The list includes such subjects as: legislation that would be of assistance to the development of chemical research; analytical methods; the possibility of creating new industries in Peru and to take advantage of indigenous materials which so far have not had adequate exploitation; standardisation of chemical, clinical, and biological methods; and the introduction of chemistry as a compulsory subject of study in all state schools.

The Seaweed Industry

MANY prosperous industries have been built up on the winning and refining of natural products, and it is to them a most unfortunate circumstance when science devises a process whereby those products can be manufactured more cheaply on a commercial scale. The fate of such industries does not even hang in the balance; they are bound to be eliminated sooner or later. The case of the seaweed industry, however, is unique in that it has been alternately destroyed and revived by scientific progress. Dr. T. Dillon, Professor of Chemistry at University College, Galway, described the changing fortunes of the seaweed industry, and indicated in what direction future revival of the industry might lie, at a meeting of the London Section of the Society of Chemical Industry. The first industrial use of seaweed in this country was for the manufacture of alkali from kelp in the eighteenth century. Kelp was the first source of alkali in Great Britain and a prosperous trade was established. In 1821 Muspratt founded the first English alkali works utilising the LeBlanc process and by 1840 kelp was finally discarded as a source for commercial production. The seaweed industry thus suffered its first blow from the hands of science. Its fortunes were again altered shortly afterwards by the discovery of the relatively large iodine content of seaweed. Factories were started in Ireland, Scotland and Brittany for its extraction, but they were soon in difficulties owing to iodine production from Chile nitrate. Apart from a short period after the war when seaweed was utilised for the extraction of potash, this was the last occasion when the seaweed industry was in active production. According to Professor Dillon, any future revival of the industry must now depend on the successful use of the organic constituents of seaweed.

Extraction of Alginic Acid

ALGINIC acid, a polymerised uronic acid, which can be obtained from seaweed, has many industrial and pharmaceutical applications. Its salts are useful textile treating agents and the acid itself can be spun into threads. The other organic constituents of seaweed comprise cellulose (about 7 per cent.), polysaccharides and mannitol. A polysaccharide, to which the name laminarine has been given, can be easily extracted, but no information has yet been acquired concerning its structure. Nor has it been determined in what combination the nitrogen, phosphorus, potassium and other elements shown to be present by analysis occur. These are problems which might repay investigation. A serious obstacle in the way of the preparation and purification of alginic acid is its extremely high viscosity. It is far too glutinous to filter in any degree of concentration. Professor Dillon described a number of processes of treating seaweed, such as retting, followed by storage in closed vessels, and fermentation, which largely overcome this difficulty. After removal of the alginic acid as its sodium salt, the residue can be used as a fertiliser and it also forms serviceable wallboards on compression.

Industrial Uses of Silver

A GROUP of leading American silver producers decided last year to sponsor a programme of research to develop new industrial uses of silver. In a communication to the Journal of the Franklin Institute, the Director of the U.S. National Bureau of Standards gives an account of the progress which has been made in the scheme so far. Apart from new applications in the field of engineering due to investigations of the mechanical properties of silver and its alloys, very satisfactory results have been obtained with silver as a catalyst in the oxidation of ethyl alcohol, operating at conditions varying considerably from commercial practice. The ability of silver salts to act as potent fungicides has been demonstrated, and the agricultural possibilities are being studied. New methods for obtaining adherent silver deposits on steel by electrodeposition and for co-deposition of a number of elements with silver, are expected to extend the usefulness of silver-plating in the chemical and other industries. Data being obtained on heat transfer through silver already indicate the increases in thermal economy which can be obtained with silver apparatus. The permeability of hot silver to oxygen has been considered as a means of fractionating air, enriching blast furnace air, and for similar applications.

Flocculation Applied to Effluents

Some Technical and Commercial Aspects of the Phenomena and of the Agents Employed

WITHIN the last twenty years investigators have devoted a great deal of time to the study of methods and means for the prevention of pollution and the fouling of rivers and streams by industrial and other effluents, said Mr. J. O. Samuel, M.Sc., F.I.C., in his paper on "The Theoretical and Commercial Aspects of Flocculation" read at a meeting of the Institution of Chemical Engineers held in London, on March 8, when the president, Dr. Wm. Cullen was in the chair. In many parts of the country the pollution problem is an acute one, especially where new industries have been established with no known economical methods of dealing with their trade wastes.

Just over ten years ago Mr. Samuel joined the staff of a South Wales anthracite coal company, to set up a research department to investigate a problem of pollution which at the time was a matter of serious concern. The pollution in this particular case was due to the effluent from the washing of coal, which gave trouble to farmers, fishery authorities and also other works which used the water from the polluted river. Previous publications on investigations on flocculation phenomena were very few. A British patent of 1927 (Burrows, Sinnatt, Slater and Simpkin) claimed precipitation of suspended matter in washery water by means of lime, sodium silicate, aluminium silicate, aluminium sulphate, casein and glue, but no detailed results were given. In 1928 Berthelot (*Génie Civ.*, 1928, *92*, 387) published his observations on the reduction in the ash contents of fine coal when washed in dirty water to which had been added certain reagents, such as the chlorides, sulphates, and nitrates of polyvalent metals, and acetic acid. Later, Needham (*Trans. Inst. Min. Engrs.*, 1930, *79*, 498) published some results on the flocculation of suspensions of coal and clay with lime and aluminium sulphate.

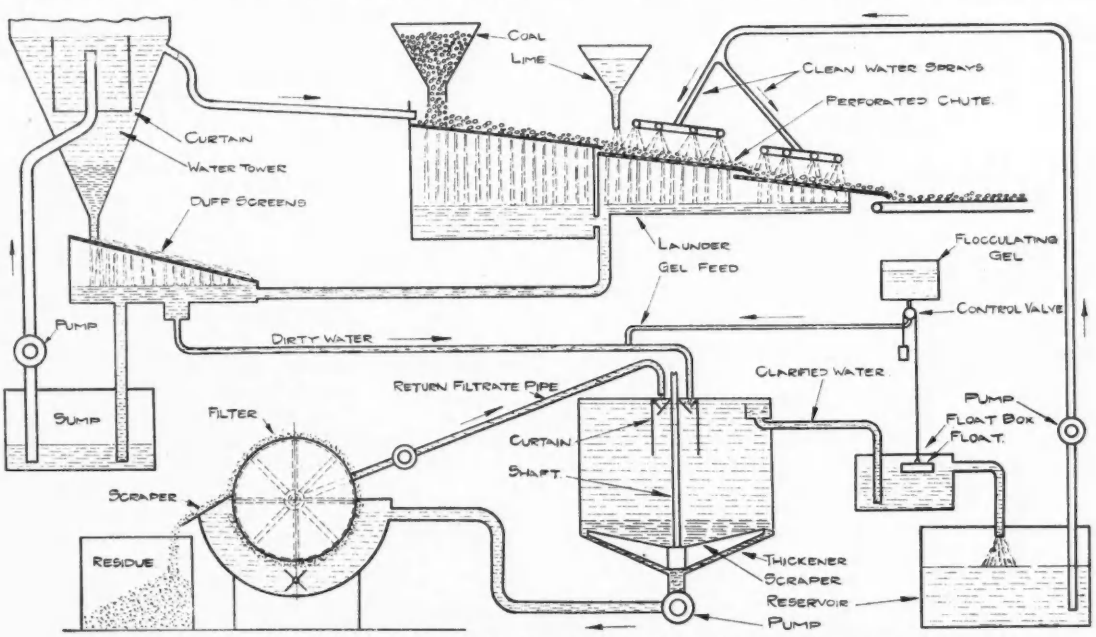
A detailed investigation was made to determine the effect of common reagents on washery effluents containing principally coal and clay in a very fine state of subdivision. These results were published in *Proc. S. Wales Inst. Eng.* in 1932 and later, in 1933, submitted in the form of a thesis to the University of Wales. It was found that finely divided coal and clay in suspension were without exception reactive towards the soluble hydroxides of metals. For example, addition of lime or ammonia to such suspensions invariably accelerated the rate of settling of the suspended matter. In some cases floc formation is distinct, in others less so, and, in some difficult to observe. Table I shows comparative data of the effect of some common hydroxides and salts on a suspension of a typical coal slurry.

TABLE I.

Flocculating reagent, 0.02 gm. anhydrous salt in 100 cc.	Time in min. for Suspension to clear.
$Ca(OH)_2$	3·5
$CaCl_2$	23.0
$CaSO_4$	29.0
$Ca(NO_3)_2$	51.0
$Ba(OH)_2$	7.0
$BaCl_2$	33.0
$Ba(NO_3)_2$	67.0
KOH	10.5
NaOH	10.0
NaCl	93.0
Na_2SO_4	110.0
$NaNO_3$	195.0
LiOH	4.0
NH_4OH	23.0
$(NH_4)_2SO_4$	129.0
NH_4Cl	120.0
NH_4NO_3	150.0

Examination of this table shows that the sulphates, chlorides and nitrates of calcium, barium, potassium, sodium, lithium and ammonium are not nearly so effective as the hydroxides as flocculating agents. It is therefore the hydroxy ion that is the most active constituent in promoting flocculation.

In view of the fact that coal and clay give suspensions of negatively charged particles, the flocculation of a negative colloid by a negative ion was unexpected. It was found to take place in two stages: (1) Preferential adsorption or formation of solvation shells of hydroxyl ions upon the col-



Diagrammatic arrangement of equipment for flocculating, thickening and filtering of suspensions.

loid surface, increasing the negative charge, the magnitude of this effect being dependent not only on the extent of adsorption of the ion, but also on the nature of the colloid. When the adsorption stage is complete the positively charged metallic ion produces flocculation probably by neutralisation of charges; here the effect is greater the higher the valency of the metallic ion.

Examination of a great variety of different trade effluents has shown that the stage of adsorption of the hydroxyl ion takes place without exception on such different materials as coal slurries, clays of all descriptions, *e.g.* china clay, common garden clay, river muds, suspensions of metals and metallic oxides, fine chemical precipitates, *e.g.* barium sulphate and gypsum and some fibres provided these are suspended in water as a medium, at neutral, slightly acid or alkaline *p*H values. As adsorption of OH groups would be obtained on such suspensions, thus increasing the negative charge on the particles, it remained only to neutralise this charge effectively by addition of positively charged polyvalent metallic ions, to give better results than had hitherto been obtained.

Starch Pastes as Efficient Flocculating Agents

Attention was directed, therefore, to positively charged emulsions of glues, gums, resins and starches. Of these only freshly prepared starches gave encouraging results. Natural glues or gums formed emulsions which either deteriorated with loss of stability or differed in their action as flocculating reagents on slurries of different origin; the reason for this has not been investigated. Freshly prepared starch pastes give fair flocculation on negative suspensions with much improved results and larger flocs if added after the addition of lime. These flocs, however, formed slowly, were fragile and bulky and had low rates of settling, due to very weak retaining forces in the floc structure. The efficiency of starch pastes as flocculating agents, however, deteriorated rapidly on storage; means were therefore sought to stabilise the flocculating action and improve the efficiency of flocculation.

Certain salt hydrates prevent degradation. When used in certain mixtures to give a particular viscosity, heat of dilution, and boiling point, these hydrates bring about the solution of the outer cell membrane and amylocellulose to form a very stable gel of characteristics quite different from those of the original starch paste.

The adsorption of hydroxyl ions on the surface of colloidal particles in suspension, though wide in its application, is not a universal phenomenon. During the course of investigations with trade effluents of many types, it was found applicable to suspensions of coal, clays, metallic oxides, most salts of metals precipitated in a fine state of subdivision, e.g., barium sulphate, calcium sulphate, flue gas washings and suspensions of minerals and inorganic substances in water. This adsorption stage is always followed by a flocculating stage on addition of the starch salt gel. On the other hand, suspensions of fibres, vegetation, paper pulps, cereal discards, such as brewery wastes, are generally not sensitive to hydroxyl ions but are reactive to certain sulphates and chlorides to give the necessary adsorption stage. Followed by the addition of the special reagent, floc formation with a well chosen combination is efficient and economical, and gives better results than the older established methods of adding alum, lime and similar substances.

Floc Size and Settling Rate

Although in the first class of suspensions mentioned, the size of flocs after flocculation can be controlled to be approximately the same size, between $\frac{1}{8}$ in. and $\frac{1}{4}$ in. dia., the settling rates vary with the density of the suspended particle. A normal coal-clay after flocculation of a 5 per cent. suspension in water settles at the rate of 1 to 2 ft. per min. Flue dust washings may settle at three times this rate, while colloidal iron oxide has a settling rate of 10 ft. per min. The improvement in filtration rates of the settled sludges after flocculation is usually good. Coal-clay mixtures which normally without flocculation are difficult to filter, can be filtered readily after flocculation. This improvement is greater, the smaller the quantity of colloidal clay in the mixture, that is flocculated clays are more difficult to filter than flocculated coal of the same particle size.

Effluents containing suspended organic matter, such as vegetable pulp, milk, etc., are treated with a metallic chloride or sulphate and the prepared starch reagent. The quantities of reagents used are small generally 0.05 lb. per 1,000 gal. when the suspended matter is about 200 parts per 100,000. The rate of settling of fibres, vegetation, pulps, etc., varies with the amount of dirt associated with such matter.

Paper pulps are usually materials requiring special care. Moderately or heavily loaded pulps present no difficulty. With almost pure fibre it is necessary to clarify in conjunction with dirt washings, such as rag washings, or to add a loading material in the form of chalk, prior to flocculation. This is necessary to increase the density of the floc to reduce settling area to a minimum. This system of flocculation has been found to bring down colour with the fibres and is independent of the extent of loading between, say, that required for good quality writing paper and a low-grade blotting paper.

Most effluents containing solid matter in suspension, but little or no polluting matter in solution, can be purified sufficiently by flocculation to be discharged into rivers. These fall into a group of their own, consisting of colliery wash water effluents, china clay, and stone quarry effluents, etc., and most paper pulp effluents when properly separated and mixed before flocculation. Other effluents, such as those from cotton bleach works, tanneries, and certain types of paper works, contain solids in suspension and polluting substances in solution, and require purification by flocculation followed by chemical and biological treatment.

Siliceous and Fibrous Filter Aids

In chemical processes, filtration of large volumes of liquids containing impurities such as ferric hydroxide and manganese dioxide presents some difficulty in filter presses. Manufacturers speed up filtration by adding substances known as filter aids. These may be siliceous such as kieselguhr or fibrous like some pulps. In each case enough filter aid is added to form a porous bed on the filter cloth. The filtration of ferric hydroxide from solutions of salts such as nickel sulphate is an example. During the course of investigations it was found that certain siliceous dusts and fibres when flocculated before use, formed free filtering media. The formation of a floc gave an active area for adsorption of the impurities during mixing and subsequent filtration.

Table II shows a comparison of the results obtained in filtering a solution of nickel sulphate containing iron hydroxide through a filter press with kieselguhr on the one hand and flocculated pulp on the other.

TABLE II.

1. Kieselguhr (30 lb./1,000 gal.).			2. Flocculated Pulp (6 lb./1,000 gal.).		
No. of Batches.	Vol. of Batch.	Time.	No. of Batches.	Vol. of Batch.	
First	1,000 gal.	55 min.	First	1,000 gal.	19 min.
Second	1,000 ,,	95 ,,	Second	1,000 ,,	22 ,,
Third	1,000 ,,	120 ,,	Third	1,000	25 ,,
First batch cloudy for a long period.			First batch showed no turbidity.		

The treatment of effluents by flocculation is invariably carried out in a specially designed clarification tank called a "thickener." This is usually circular or sometimes square in section with an effective depth of 8 ft. to 15 ft. The effluent to be treated is flocculated by the injection of measured quantities of reagents at some distance from the entry of fluid into the thickener so as to give a time interval for flocculation to proceed. The adsorption or primary dosing with lime or other suitable salt is done at a point some distance from the point of adding the flocculating reagent. The quantities of reagents are all controlled by automatic valves operating in a V-notch box in the outlet or sometimes inlet end of the system and controlled by floats in such a manner

that the quantities of the reagents added are proportional to volumes as indicated by the V-notch.

The flocculated suspension on entering the thickener is given a rotary movement by its own velocity inside a central curtain of specific dimensions; this provides a turbulation zone of definite concentration of solids depending on the density of the material handled. Small, undeveloped or broken fragments of flocs are trapped in their passage through this zone by surface adsorption on larger flocs. The clarified liquor overflows the top periphery of the thickener into launders for despatch or re-use in the factory. An outline diagram of such a system is shown on page 201. The settled pulp or slurry is then subjected to the action of a " box type " or " closed in " type of thickener, designed specially for use on flocculated sludges.

Natural deposition of flocculated particles results in the formation of a more bulky sludge than that from unflocculated particles. This extra bulk is in most cases due to water filling up the voids between individual flocs much as a sponge takes up water. Disturbance of the floes by slowly revolving rakes or spiral arm serves only to fill up these voids by reshuffling and has no decisive pressing action on the flocs themselves. The efficiency of these devices is higher with unflocculated sludges than with flocculated sludges.

In practice, the following comparisons have been made between the settling of flocculated coal slurry naturally, with ordinary rakes, and with the box type structure :—

Mesh of Slurry.	% Solids Natural Settlement.	% Solids using Rakes.	% Solids Special Scraper.
100%—200 mesh	18.0	21	28.5
100%— 60 ,,	42.0	48	54.0
40%—200 ,,			
100%— 60 ,,	54.0	57	64.0
25%—200 ,,			(difficult to pump, relief holes cut in scraper).

The outputs of these filters vary with the material handled. For coal-clay mixtures, the outputs may vary between 50 lb. per sq. ft. per hour for mixtures with high proportions of clay, to 300 lb. per sq. ft. per hour when the proportion of clay is low. For moderately loaded paper pulps containing dirt from washings and china clay, a yield of 5-10 lb. dry weight of pulp per sq. ft. is good.

Production of Oil from Coal by Hydrogenation

Dr. Shatwell Reviews the History of the Process

THE fourth of the series of lectures on the production of oil from coal at the College of Technology, Rotherham, was given on March 2, by Dr. H. G. Shatwell, M.Sc.(Tech.), Ph.D., M.Inst.P.T., his subject being " The Production of Oils by Hydrogenation." He dealt mainly with the historical development of the hydrogenation process, beginning with the early work of Berthelot, who, in 1869, successfully liquefied coal by heating it under pressure with hydriodic acid.

It was Bergius who initiated the modern version of the process, said Dr. Shatwell. He treated coal, mixed with an equal quantity of oil, at temperatures of about 450° C. and hydrogen pressures exceeding 100 atm., to produce large yields of oil, which were of a tarry, rather than a petroleum, nature. The first systematic investigation of the hydrogenation of British coals was undertaken by Graham and Shatwell in the mining research laboratory at Birmingham University. They showed that a number of bituminous coals could be converted substantially to oil in presence of phenol but in absence of catalysts, and the research was extended by Graham and Skinner, with considerable success, to the treatment of over 30 coals of widely varying types. These results were confirmed, first in rotating autoclaves, and then in a continuous plant capable of treating one ton of coal per day, which was erected in 1926 at the Fuel Research Station.

The process was then investigated intensively by the I.G. in Germany, whose first important discovery was that the oxides and sulphides of molybdenum and tungsten are capable of catalysing the reaction. By 1935, 300,000 tons of motor spirit were being made in Germany annually by the hydrogenation of brown coal, whilst to-day the total production by the I.G. is 700,000 tons per annum from brown coal, and 150,000 tons from bituminous coal. Other plant under erection or contemplated will increase the output by a further one million tons annually. The contemplated total of 1,850,000 tons is equal to about 45 per cent. of the annual imports of petrol into Great Britain and Northern Ireland.

In Great Britain developments were undertawen by Imperial Chemical Industries, Ltd., at Billingham. The researches, begun in 1927, dealt exclusively with bituminous coal the hydrogenation of which, on a technical scale, was rendered possible by three important inventions. First it was established that metallic tin, injected with the coal paste in the form of organic compounds, is a very active and sulphur tolerant catalyst. Next the efficiency of tin was found to be greatly augmented by the addition of hydrogen chloride. Finally, the corrosive effect of the latter in the condensers was destroyed by condensing the vapours in the presence of a stable emulsion of an alkali and a heavy oil.

The process is conducted as follows: A paste composed of equal quantities of powdered coal and heavy oil is mixed with small quantities of an organic compound of tin and treated under high hydrogen pressures in the liquid phase in a reaction chamber of special design. The conditions are adjusted to produce an excess of heavy oil, which is separated from the accompanying petrol and middle oil by distillation. A part of the heavy oil is used to make fresh coal paste, while the remainder is re-treated in the liquid phase to give further yields of petrol and middle oil. The middle oils are then hydrogenated in the vapour phase to produce motor spirit (yield 180-200 galls. per ton of coal).

The resulting motor spirit is of excellent quality with an octane number of about 70, which can be increased to 80 by the addition of lead; aviation spirit with an octane rating of 87 is also being produced. The total capacity of the Billingham plant is 100,000 tons of spirit per year from coal and 50,000 tons per year from creosote and tars. The consumption of coal for the 100,000 tons per year plant amounts to 5 tons per ton of petrol, but it is estimated that this will be reduced to less than 4 tons in a completely new plant in which the permanent gases can be more efficiently handled.

I.C.I. and I.G. Form New Company

Manufacture and Sale of Dyestuffs

IMPERIAL Chemical Industries, Ltd., has joined with the I.G. Farbenindustrie in the formation of a new company styled the Trafford Chemical Co., Ltd. (Registered No. 337,547). The new company, with a nominal capital of £500,000 divided into 500,000 shares of £1 each, is to provide for co-operation between I.C.I. and the I.G., with their respective subsidiary companies, in the manufacture and sale of dyestuffs, intermediates and other related organic chemical products. The first directors are Francis Walker, Cecil J. T. Cronshaw, and Donald R. Mackay, appointed by I.C.I., and Alfred H. George (chairman), Heinrich G. Kohler, and Osker A. Loehr, appointed by the I.G. It is understood that for the time being the paid-up capital will be £300,000, of which I.C.I. will hold 51 per cent. and the I.G. 49 per cent.

Letters to the Editor

Long Tubes in Evaporators

SIR,—I have read with considerable amusement the letter from Mr. Brian N. Reavell, who seeks to support an accusation against me of "woeful ignorance" by a controversial artifice so transparent as to be ridiculous. I must leave it to your experienced readers to judge whether it is an exhibition of "woeful ignorance" on my part to make the statement that long evaporator tubes are more difficult to clean than short ones. I feel sure that the experienced readers will not be surprised when I say that my head is unbowed.

Mr. Reavell attempts to support his argument by a comparison between a conveniently built long tube evaporator and a most inconveniently built short tube evaporator. In the wealth of his knowledge, Mr. Reavell must surely be aware that short tube evaporators are very frequently constructed in such a manner that the tubes are accessible for cleaning, and that the operator may equally work in the "open air" in the case of the short tube evaporator.

My statement that the design of the long tube evaporator was cheap I consider to be perfectly proper in a technical article, particularly as it happens to be true. Surely it is a compliment to a designer to tell him he has succeeded in cheapening something. In some cases it is permissible to sacrifice something in the way of convenience or efficiency for the sake of cheapness. I think it would be best for Mr. Reavell to read my original remarks once more: it would have been better for him to have read them more carefully before rushing into print with his letter.—Yours faithfully,

London, S.W.1. PETER J. BAR.

March 8.

Lime Calcining

Effect of Vapour of Common Salt

THE effect of sodium chloride vapour on the calcination of limestone has been studied by Noda (*J. Soc. Chem. Ind. Japan, Supp. Binding, 40,* 417-18B). Small blocks of limestone were calcined at various temperatures in the presence and absence of sodium chloride, this being in most cases present in the vapour state only, but in a few instances it was allowed to condense on the resultant lime. The calcination products were examined under the microscope.

In the absence of sodium chloride, the lime produced by calcination at 1,000° C., was a loose mass of minute crystals of less than 1 micron diameter. At 1,200° the average crystal size was 2 microns, and at 1,300° it was 3 microns, the product becoming harder and more compact as the temperature of calcination became higher, so that at 1,670°, the lime produced was a very hard and dense mass, with an average particle size of 20-60 microns. In the presence of sodium chloride sintering occurred at considerably lower temperatures, resulting in the production of limes of larger particle size—the average diameter was 4 microns at 1,000°, 8 microns at 1,200° and 11 microns at 1,300°. The products were loose and porous in all cases, and the individual particles, particularly in those cases where a small amount of chloride was allowed to condense on the lime, were very uniform in size and shape, having the form of globular tetrahedrons.

The rate of hydration of the limes produced in the ordinary way at 1,000° and 1,100°, was higher than of those produced by calcination in the presence of sodium chloride. At higher temperatures the reverse was found to be the case. The explanation put forward is that the effective surface at the lower temperatures is greater in the case of the untreated lime; at higher temperatures the individual particles of untreated lime sinter together into agglomerates, thereby considerably diminishing the total surface in comparison with the product of calcination in the presence of salt, which remains in all cases porous.

The British Association of Chemists

Annual Dinner of the London Section

THE Annual Dinner of the London Section of the British Association of Chemists was held at the Waldorf Hotel, London, on March 5. The chair was taken by Mr. G. T. Gurr (chairman of the London Section).

Proposing the toast of "The British Association of Chemists," MR. A. J. C. COSBIE, Chairman of Council, said the primary object of the Association was its Unemployment Benefit Scheme, and he was glad to say that it was in a very healthy condition. Another important object of the Association was the Legal Aid scheme, which continued to do excellent work. Incidentally, the *Chemical Practitioner* had recently been altered in form and as far as he could gather it met with general approval. Yet another important object was the Appointments Service, and during the past three years there had been a very great increase in what was called direct approach, i.e., employers came direct to the Association when they wanted additional members for their staffs. In the Legal Aid Department, 27 cases had been dealt with and advice given, while during the current year, so far, 11 cases had been dealt with. All these, said Mr. Cosbie, were achievements of which the Association might well be proud.

An Atmosphere of Friendship

DR. J. VARGAS EYRE, President of the Association, responding to the toast, and remarking on the success which the Association was achieving, said he thought this was due to the fact that it was a most friendly society. In the foreground of the objects of the Association was the need to look after the interests of the individual members, to develop their professional outlook and their opportunities and to safeguard their welfare wherever possible, rather than to build up an organisation which a few might be proud to belong to. The membership of the Association was growing, and that was a strong indication of a healthy organisation. The membership was now about 2,000, and 90 per cent. was actively engaged in doing things. Personally, he felt that those of the older men in the industry who had a little time to spare and some opportunities, should do all they could to look after the young men leaving college and taking their first job. A little guidance at an early stage would sometimes make a tremendous difference to the prospects of the young men whom he had in mind. No better way of assisting to do this could be imagined than membership of the B.A.C., because that was a sympathetic body which only wanted support from such quarters. Dr. Eyre said that there had been a good deal of talk about the amalgamation and unification of scientific organisations, and he believed that amalgamation of the scientific societies would take place in the provinces before anything of the kind was accomplished in London.

MR. S. R. PRICE, Past President, proposed "The Guests," and extended a special welcome to Miss Eleanor Rathbone, M.P., who during the past year or two had taken such a sympathetic interest in the work of the Association, and to Mr. H. J. Pooley. He expressed the hope that the Association would always work in the greatest harmony with the other organisations in the chemical industry, as it endeavoured to do at the present time.

MISS ELEANOR RATHBONE, M.P., and MR. H. J. POOLEY responded to the toast. The latter took up the point made by Dr. Eyre with regard to the impossibility of amalgamation of societies concerned with the chemical industry, so far as London was concerned, and that anything of this nature must start in the provinces. In disagreeing with this point of view, Mr. Pooley said there was a very definite movement going on now for the amalgamation of chemical societies and institutions, and so far there had been a very great measure of success.

CAPTAIN P. R. PORTER proposed "The London Section and the Chairman," to which MR. G. T. GURR responded.

The Work and Ideals of a Public Analyst

Pure Food, Pure Water and Pure Air

THERE were three essentials for a healthy life—pure food, pure water and pure air, said Mr. Arnold R. Tankard, F.I.C., of the Hull City Laboratories, when he delivered a lecture before the Hull Chemical and Engineering Society on February 15. The work of the public analyst and corporation chemist was largely concerned with these three primary requirements of modern hygiene, although, of course, it often covered a much wider field.

Purity of Food Supplies

The public analyst regularly examines, by chemical analysis, by physical and microscopical methods, and by bacteriological technique, most of the foods which we eat, in order to determine their soundness, purity and quality. The foods coming under scrutiny include those exposed for sale, those in transit or in course of delivery, and those imported from abroad. The function of the analyst is to detect any illegal substitution or adulteration of a food or drug, and to issue a certificate condemning any article which in his opinion is harmful by reason of the presence of a dangerous impurity or ingredient, or which is not of the quality rightly demanded by the ordinary purchaser. Action against the responsible person can be taken either by legal prosecution or by other means.

The lecturer showed by means of slides the large volume of work passing through the Hull City Laboratories, and the results of the analyses carried out in the various sections of the department. Thus it was stated that whereas the milk adulteration figure in 1885 was about 21 per cent., it had dropped to 3.9 per cent. in 1937. The figures for other foods were also generally fairly satisfactory and encouraging, but it was necessary to maintain constant vigilance, since whilst the majority of food providers, to whom a tribute was paid, did give the public a reasonably good article, there were still those who could only be prevailed upon to do so by regular and definite control.

The state of affairs in Accum's time (1820), and that of Dr. Hassall (1851), were contrasted with our own times, and it was shown that as a result of the Food Adulteration Act and allied legislation, the food supply of large cities especially was kept pure and of satisfactory quality for the most part, although reform of the somewhat hesitating and ambiguous clauses of the operative Acts was advocated. The lecturer mentioned that in the draft bill already presented to Parliament, there were some welcome additions and alterations to the existing law, especially with regard to the control of advertisements of foodstuffs.

Examination of Milk

Having quoted a remark of the present Minister of Health, that the great improvement in the purity of our food supplies is largely due to the work of the public analyst, Mr. Tankard proceeded to review the work done by public analysts in relation to milk and the detection of its adulteration by water, especially in connection with the determination of the freezing-point of milk and its natural variations; the bacterial purity of milk and its freedom from dirt; and the methods employed in the laboratory to control the supply of graded milks by regular bacteriological examinations and chemical and biological tests. The pasteurisation of milk was stated to be one method of ensuring its freedom from harmful organisms, and in spite of slight alterations in composition, which were probably trivial, the process of heating milk under controlled conditions was shown to be perhaps necessary and desirable if the bulking of milk from a large number of different farms was allowed.

The efficient working of the regulations relating to preservatives was exemplified by statistics showing the reduction in the percentage of chemically-preserved foods, and satisfaction was expressed with the results of these regulations, whereby the public had now the opportunity to buy fresh and sound foods in nearly all cases, and the necessity for scrupulous cleanliness was imperative, as well as being desirabe in itself. The popular idea that food poisoning was due to mysterious substances called "ptomaines" was once again shown to be contrary to scientifically-ascertained facts, which proved that these cases were due to specific micro-organisms of disease, belonging to one or other of a few fairly well defined classes. The presence of preservatives in foods containing pathogenic organisms would have no effect on such organisms, and would not reduce the number of food-poisoning cases.

Some Cases of Undesirable Chemical Treatment

Concern was felt by Mr. Tankard at the many forms of chemical treatment of foodstuffs to-day, since some of these seemed to savour of a subtle evasion of the spirit, if not of the literal interpretation, of the regulations relating to preservatives. Moreover, substances were being used at the present time for the treatment of foods by fumigation, etc., which were by no means physiologically inactive, and indeed were in some instances known to be poisonous. The bleaching of fruits; the artificial flavouring of butter; the addition of foreign substances to butter to emulsify the fat with the water, having the effect of rendering excessive water-content unnoticeable; the use of organic compounds of considerable chemical activity for the fumigation of dried fruits with a view to the destruction of insects; the artificial ripening, in colour and appearance only, of fresh fruits by means of gases; the spraying of growing fruits and vegetables with highly poisonous arsenates and other substances without adequate precautions for their removal—all these methods were stated to have objectionable features and some were fraught with danger to the consumer. The present law did not control in any effective way any of these methods of treatment.

The lecturer put forward a plea for the examination of all these methods of food treatment by a competent panel of scientific men under Government auspices, before any of the methods were allowed to be used on food for human consumption. He went on to show how the microscope had helped enormously in the detection of food adulteration, and after a reference to Hassall's work in this connection, a series of slides was shown to illustrate the value of the microscopical method of examination. Other slides showed the size and shape of glass splinters and fragments which had been found in foods sold in the area some years ago; the great improvement in the composition of potted meats which had taken place since the Corporation set up its standard of freedom from farinaceous additions and from more than 70 per cent. of water; and the value of the ultra-violet light examination of many foods as a guide to purity and composition.

Water supplies were next touched upon. Whilst it was the engineer who brought the water to the consumer, it was the chemist who had to see that it was of satisfactory purity. The importance of pure water supplies in country areas, whence the milk supply of towns came, was emphasised.

Atmospheric Pollution

The subject of atmospheric pollution was introduced with the statement that whilst we have gone a long way in securing for the public of our towns pure foods and pure water, we are far from giving our citizens a pure atmosphere. The open domestic fire, burning raw coal, was our worst enemy. It was wasteful, it resulted in the contamination of urban air with smoke, soot, tar and acid vapours and in reducing the health-giving qualities of sunlight. So this nuisance harmed our health, plant life, clothes, house decorations, stone buildings and art treasures. Slides showing the impurities in Hull air, averaging a total of insoluble and soluble matters over

the City of 200 tons per square mile, each year; the sulphur dioxide content of air; and the ultra-violet light strength illustrated these points in the lecture.

The work of a local authority requires the use of large quantities of stores of all kinds, and these were in many instances examined in the City Laboratories for quality and suitability for their intended purpose, and for conformity to the specifications laid down. In this way, coal and coke, oils, petrol, paints, disinfectants, building materials, metals, and many other materials were submitted to the laboratory for report and recommendation for purchase. As the corporations of the country consumed in their hospitals and other institutions large quantities of foods, a better quality of these foods could be and were demanded than could often be obtained for the general public, whose foods had merely to conform to an inadequate food law.

The lecture ended with a description of some of the many problems that arise in connection with the general work of the laboratory and in investigations relating to poisoning cases and police work. As scientific adviser to his authority, the public analyst had placed at the disposal of the public the resources of modern science, and, it was submitted, had amply demonstrated that his work was of high value to the community.

Cosmetic Manufacture

French Production of a Series of Fatty Alcohols

THE preparation of raw materials for the cosmetic industry is being developed in France with the erection of a plant for the industrial preparation of a series of fatty alcohols and their ether and sulphonated derivatives.

These products have generally been produced in France only by laboratory methods. The new plant of Lambert Riviere makes use of new catalysts which permit the hydrogenation to be carried out at much lower temperatures and pressures. This avoids the formation of hydrocarbons which sometimes exist as impurities in the ordinary qualities of synthetic raw materials of this type. The raw materials are oleic acid, stearic acid, and the fatty acids of certain vegetable substances such as that obtained from copra. The new products are being sold under the general name of "Tapol."

Tapol O is obtained by the selective hydrogenation of twice-distilled oleic acid. It is non-acid and normally pasty in consistency, though it melts easily at body temperatures. The odour is very faint and somewhat resembles that of cocoa butter, which makes it quite suitable for cosmetic purposes. It can be used as a base for massage creams, such as those made with vitamins. Being an alcohol, and having a double linking, Tapol O has a very high degree of oiliness. It can be used to replace glycerine in ordinary beauty cream. Tapol C is made from stearic acid which has been purified of any impurities in the form of lactones and other substances which may give disagreeable odours to the finished product. It is insoluble in water, but in the presence of stearates, sulphoricinoleates or sulphonated fatty alcohols it forms a pasty white emulsion. Used in creams on a stearate base to the extent of 2 per cent. to 5 per cent. it keeps them from sweating by absorbing the excess water. Tapol L is made from the fatty acids of coconut. It has the characteristic odour of lauryl alcohol, and acts as a fixer to perfumes.

Natural and Artificial Wool

A Simple Distinguishing Test

A SIMPLE method of distinguishing between natural wool and artificial casein fibres (such as "Lanital") is described by Whittaker (*J. Soc. Dyers and Colorists, 53,* 468).

The test, which was devised by Tattersfield, consists in immersing the fibre for one minute in a cold solution of 0.5 gm per 100 cc. of a wool dye (such as Xylene Light Yellow 2G) containing 0.5 cc. of 80 per cent. sulphuric acid per 100 cc., followed by rinsing. Under these conditions it is found that wool is only slightly dyed, whether chlorinated or not, whereas casein fabrics are dyed a full shade. If Neocarmin W be used, full dyeing is obtained on both fibres, but the colour of the wool is bright yellow, whereas that of the casein is deep orange. Ultra-violet fluorescence provides a further method of characterisation, since undyed wool gives a weak violet fluorescence, in contrast to the dead white reflection obtained from undyed casein fabrics.

Analysis of Dairy Products

New Standard Methods

TWO new specifications relating to the chemical analysis of dairy products have been issued by the British Standards Institution, namely, Methods for the Chemical Analysis of Butter (No. 769), Methods for the Chemical Analysis of Cheese (No. 770).

The Dairy Research Committee, appointed by the Empire Marketing Board, had, as one of its objects, "to advise on the examination of such defects as are found in the condition and quality of imported dairy products and the possibility of effecting improvement in flavour, carrying quality, etc." This committee came to the conclusion that satisfactory comparison of results could not be made without a common technique, and, as a result, appointed, in 1930, a sub-committee to consider in detail the standardisation of methods of analysis of milk, cheese, and butter samples.

The work of the Empire Marketing Board Dairy Research Committee was taken over by the British Standards Institution in 1933, and continuity was assured by the appointment of the board's committee to the committee of the British Standards Institution entrusted with the completion of the work. Preliminary reports were prepared and widely circulated to the statutory dairying authorities in the various countries of the British Commonwealth.

As a result of the comments received, it has been decided to restrict the standard methods to the recognised methods used by chemists in the routine examination of butter and of cheese, and to include such supplementary special tests as had been found of value in the tracing back of defects. It is intended to review these methods at intervals of not less than two years, in order to make any modifications or additions which are considered advisable. Copies of these new specifications may be obtained from the British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. each (2s. 2d. post free).

Emptying Acid Containers

A New Safety Siphon

A NEW type of non-pressure siphon for avoiding hazards in removing acids from glass carboys, steel drums and barrels has been developed and patented by Mr. T. P. Callahan, a prominent executive of the Monsanto Chemical Co. This device, which is manufactured by Hygenic Products Corporation, of Portland, Maine, U.S.A., is claimed to be the only siphon with non-pressure safety features, and has been tested and recommended by the Carboy Committee of the Manufacturing Chemists' Association of the United States, and also by the Bureau of Explosives. It is adapted to fit any size opening on the container, and easy to operate. Known as the T.P.C. safety siphon, it delivers up to 2 gallons per minute, the rate of delivery being regulated by an adjustable slide or flow valve. No continuous pumping or tipping is necessary; after priming, the flow is automatic and is controlled by the flow valve.

The Sterilisation of Water by Chlorine

Practical Aspects of Standard Methods for the Application of a Widely-Adopted Process

THE chlorination of water formed the subject of a paper which Mr. L. T. le G. Burley, of I.C.I. (General Chemicals), Ltd., read before a meeting of the Institution of Engineers-in-Charge. He pointed out the modern methods of water purification may include (a) storage and aëration; (b) addition of lime or soda to correct acidity; (c) coagulation to assist sedimentation and to improve the colour; (d) sedimentation; (e) filtration; and (f) sterilisation.

Some reduction in bacterial infection can result from any of the first four processes, but since cost of sterilisation by modern methods need be only a small part of the cost of delivery of the treated water to the consumer, most supply authorities have adopted it as a separate process. A period of storage may be all that is necessary to sterilise certain waters, and surface waters from very high land and certain deep well waters can be drunk without any treatment at all. But with the increasing importance of river water (which may be heavily polluted) as a source of supply, increased attention is being paid to adequate sterilisation. Chlorination by one or other of the standard methods is the most widely-adopted sterilisation process.

Nature of Contamination

Bacteria, algæ and other living organisms found in all natural water supplies are derived from the air, particles of dust, surface drainage, or from leakages of sewage. Their reproduction is encouraged by abnormally high water-temperatures, or by the presence of dissolved foodstuffs. Most of the germs in a water supply are harmless to man, but the organisms derived from sewage are dangerous and cause such water-borne diseases as typhoid and cholera. When they occur in drinking or swimming-bath water, these organisms have, of course, to be destroyed, but where the water is to be used for industrial purposes only, it is necessary merely to prevent them from multiplying, and to suppress algæ forming green slime and giving rise to unpleasant odours.

Bacillus Coli is adopted as the indicator of pollution, because although not in itself considered very dangerous to man, it invariably accompanies the germs of water-borne diseases, and because it is more resistant to the action of chlorine than most other water-borne organisms. Moreover, a water containing *B. Coli* indicates pollution by sewage or drainage from pastures. It is also one of the easiest organisms to detect. The usual standard of safety, both for drinking and swimming-bath water, is accepted as "*B. Coli* absent in 100 c.c."—a standard easily attained by simple chlorination. The "count test" is not of much importance by itself, but serves as a valuable confirmatory test of bacterial purity. A "count" in the lower hundreds per c.c. is considered satisfactory, but a figure in the thousands indicates pollution.

Chlorinating Compounds

Chlorination can be carried out with chlorine itself, or with some chlorine compound which, when dissolved in, or diluted with water, gives a solution containing active, or, as it is usually called, "available" chlorine.

The chlorine compounds most commonly used for water sterilisation are bleaching powder and sodium hypochlorite solution. Proprietary solutions of sodium hypochlorite containing 10 or 15 per cent. available chlorine provide an easy means of adding small quantities of chlorine to water. For large or moderately large water undertakings or swimming pools, the most convenient and inexpensive method of sterilisation employs liquid chlorine. This is obtainable in steel cylinders, drums, or rail tank wagons. Chlorine, at a concentration of less than one part in a million, is capable of killing, in a few minutes, the resistant *B. Coli*, and, therefore, also the germs of water-borne diseases.

Since chlorine is used up in attacking the organic impurities always present in natural waters, the quantity of chlorine required for sterilisation is, therefore, the quantity required to kill dangerous bacteria plus a small surplus depending upon the purity of the water. In practice, one-fifth of a part per million of chlorine is added over and above the quantity of chlorine used up by the water in twenty minutes—the so-called "twenty minute chlorine demand" of the water. For most water supplies, this last figure varies between 0.1 and 0.7 p.p.m., so that a dose of 0.3-0.9 p.p.m. is required for adequate sterilisation.

Chlorine gas is added to the main bulk of the water in solution in a small quantity of the water to be treated. About 50 to 100 gallons of water are required to dissolve 1 lb. of chlorine. A simple drip feed device is used for the delivery of regulated quantities of sodium hypochlorite solutions. For the sterilisation of drinking water, chlorination is usually carried out after sedimentation and filtration. In this way, the chlorine is given a period of thirty minutes or more to act before the water reaches the consumer. For the sterilisation of swimming-bath water, chlorine is added to the circulating water immediately before it enters the pool, and the dose is so adjusted that a concentration of from 0.2 – 0.5 p.p.m. of available chlorine is maintained at all times in the pool.

Chlorine dosage is regulated according to bathing load, and conditions of sunlight and temperature. Small pools without a circulating system can be kept sterile by spraying the surface with a dilute solution of sodium hypochlorite between bathing periods.

Modified Chlorination Processes

Two modifications of this method of simple chlorination are in common use. These are (1) the chloramine process, in which small quantities of ammonia are added to the water before the chlorine, and (2) the super-chlorination process, in which an excess of chlorine is added, and subsequently destroyed by a dechlorinating agent.

The chloramines formed when chlorine is added to water containing ammonia give off available chlorine for sterilisation, and have an advantage over chlorine alone in that their sterilising power is preserved for a longer period, although the sterilising action is slowed down. The chloramine process is thus of value under conditions favouring the rapid destruction of chlorine—as in the tropics, or in large open-air swimming pools. It is also of use in maintaining the germicidal action of chlorine in a drinking water supply throughout the entire length of the pipe system. Moreover, the addition of ammonia prior to chlorination effectively prevents the formation of tastes which may result from the action of chlorine on water contaminated with phenolic bodies such as tarred road washings, bituminous pipe jointing materials, or vegetable matter.

The chloramine process has the further useful property of reducing troubles from aftergrowth and subsequent contamination, and is therefore much used for water which has to be stored for any length of time. Its cost is very little more than that of simple chlorination. The ammonia is added in the form of ammonium salts or as ammonia gas, ¼ lb. of ammonia being used for every lb. of chlorine. The standard contact period of 20 minutes allowed for chlorine alone should be increased to 2 hours for chloramine.

Super-Chlorination

Super-chlorination is particularly useful where the layout of the treatment plant permits only a very short period of contact between chlorination and delivery to consumers. It also provides a useful margin of safety for water supplies

which are subject to sudden or very variable contamination. It will destroy tastes in water which may be present before chlorination, and which may be caused by the decay of algal growths in reservoirs and mains. As much as 100 p.p.m. of chlorine can be added, and yet the water will be tasteless on dechlorination by sulphur dioxide, sodium thiosulphate, sodium sulphite and bisulphite, or active carbon.

Simple chlorination may be used for all normal cases and for small supplies demanding simplicity of operation. The chloramine process is recommended for waters which develop a taste on addition of the normal amounts of chlorine used for sterilisation, for surface waters of high organic content, in tropical countries where the water temperature is high, and in all cases where the water has to be stored or circulated for a long time after chlorination. Super-chlorination is used for highly polluted water of low organic content and for waters which have been subjected to the effects of irregular pollution.

Wells polluted by dirty surface waters at times of flooding are conveniently sterilised by first pumping them dry, then pouring down quart bucketfuls of a 10 per cent. solution of sodium hypochlorite, filling up, and pumping the well until chlorine-free water is obtained. New water mains, and complete supply systems can be sterilised by passing a 5-10 p.p.m. available chlorine solution into the main, allowing to stand overnight, repeating next morning, then thoroughly washing out with clean water.

Heavily chlorinated water removes pipe blockages caused by iron bacteria, and, if added prior to filtration, slows down the growth of algæ on the filter bed, thus prolonging filter runs. Chlorination also removes and prevents algal slime and mussel growths in condenser cooling systems fed by canal or sea water.

Oil and Colour Chemists' Association

Members Show Increased Interest in Activities

THE 20th annual dinner of the Oil and Colour Chemists' Association was held at the Trocadero Restaurant, London, on March 4, when Dr. G. F. New (president) was in the chair and there was a record attendance of over 200 members and guests. Among those present were Mr. A. Ll. Matthison (president, National Paint Federation), Mr. S. K. Thornley (president, Paint Research Association), Mr. E. W. Muirsmith (president, Printing Ink Federation), Mr. J. B. Graham (secretary, National Paint Federation), Dr. G. L. Riddell (director, Printing Research Association), and Mr. A. L. Hetherington (assistant secretary, Department of Scientific and Industrial Research).

Responding to the toast of "The Oil and Colour Chemists' Association," proposed by Mr. A. Ll. Matthison, Dr. NEW said that the attendance on this occasion of the annual dinner was 220, as compared with 165 last year. Five meetings had been held in London during the past two months instead of the usual two and there had also been record attendances at these meetings. Instead of the normal 30 or 40, there had been attendances of from 60 to 80. This, coupled with the fact that during the past few months 40 new members had been elected compared with a normal figure of about 30, indicated that the association was very vigorous and was going ahead.

Mr. R. J. LEDWITH proposed the toast of "The Guests," to which Mr. A. L. HETHERINGTON responded.

Reduction of Na_2SO_4 to Na_2S

Conditions for Operating Furnace

THE best conditions for the operation of rotary furnaces for the reduction of sodium sulphate to sulphide have been determined by Liamine (*Jour. Appl. Chem. U.S.S.R., 10,* 2,001-2,007). The object in view was the production of a high grade sulphide of 80 per cent. Na_2S content. The first essential was found to be the employment of first quality carbon; a variety containing not more than 8-10 per cent. of mineral salts must be used. The carbon should be in pieces of 2-5 mm. diameter, as smaller pieces are inclined to burn rapidly without effecting any reduction.

The optimum temperature for the incoming gases is 1,100° C. At higher temperatures such as 1,200-1,300° C. more rapid reaction is obtained, but has a bad effect on the orifice and lining of the kiln. For good results it is essential to have the gas supply automatically controlled by the composition of the flue gas. The time for complete reaction in a 3-ton charge was found to be about 2½ hours; for 3½ tons, 3 hours; for a 4-ton load, 3½-4 hours were necessary.

Paper Making Materials

Some New Sources of Fibrous Cellulose

THE Notts and Derby section of the British Association of Chemists held a meeting at the Cavendish Café, Corn Market, Derby, recently, when two short papers were read.

MR. P. F. C. SOWTER, B.Sc., A.I.C., A.R.C.S., dealt with paper making materials. He pointed out that the basis of paper is fibrous cellulose, of which many vegetable materials are possible sources, but owing to an approaching world shortage of wood pulp the question of alternative raw materials is a pressing one. The suitability of any particular raw material depends less on its composition than on economics; it must be accessible, readily collected and treated on the spot. Among suggested raw materials the most promising were the various tropical woods and grasses; some industrial wastes such as cowshed sugar cane have also been found to be very suitable. Methods of testing these were described in detail and samples of lalang grass, Norfolk reeds and woods from Trinidad, together with the papers obtained from them, were displayed by courtesy of the Imperial Institute.

Discussing some new artificial silicates Mr. F. STANBRIDGE, M.Sc., referred to the preparation of silicates by fusion of metallic oxides with silica at high temperatures, and by precipitation from aqueous solution. Work carried out in United States Geophysical Laboratory on the lime-alumina-silica series of minerals was typical of the first method. In the newer forms of commercial sodium silicate for special purposes, there was a tendency for ratio $Na_2O : SiO_2$, to become greater.

Production of Maleic Acid

Catalytic Oxidation of Crotonaldehyde

THE production of maleic acid by the catalytic oxidation of crotonaldehyde in the vapour phase, is reported by Faith and Schaible (*J.A.C.S., 60,* 1938). The catalyst employed was vanadium pentoxide, supported on carriers of pumice and also of aluminium in the form of small pellets. The latter support was considerably more efficient than the pumice in all cases, giving very much higher yields, which is attributed to its greater heat conductivity, whereby a more even temperature distribution is obtained over the surface of the catalyst, and local accumulation of heat liberated in the reaction, which might raise the temperature above the optimum, is avoided.

For any set of conditions it was found that there is an optimum temperature for acid production, the yield falling off fairly sharply on each side of this point. It was further found that the yield increases continuously as the ratio of air to aldehyde is increased. The best yield obtained was one of 44.5 per cent., at 450° C., in the presence of V_2O_5 supported on aluminium.

Hydro-Extractors

Standard Specification to Reduce Accident Risk

A BRITISH standard for hydro-extractors (No. 767-1938), prepared as a result of a request received from the Home Office, has just been issued. The new standard deals with hydro-extractors having vertical, horizontal or inclined shafts, and running at speeds of from 400 to 3,000 r.p.m. It does not apply to the high speed centrifuges used in oil or cream separation plant, but is intended to cover those hydro-extractors used in chemical works, gasworks, dry-cleaning works, laundries, etc. Before the work was undertaken a careful examination was made of accidents which had taken place with centrifuges, and the standard has been drawn up so as to eliminate many of the defects and weaknesses which had led in the past to such accidents.

The new specification (price 2s. 2d. post free) covers the quality of materials used in the construction of the centrifuge, together with standard formulæ governing the design of the basket, etc., whilst full particulars are included in regard to electric welding. A section has also been incorporated dealing with testing, and recommendatory notes in regard to safety devices, operation and maintenance are included in the form of an appendix.

Lime in the United States

Preliminary Annual Statistics

SHIPMENTS (sales) of lime in 1937 in the United States, according to preliminary figures to the Bureau of Mines by producers, comprising about 80 per cent. of the industry, increased approximately 4 per cent., compared with 1936, when an increase of 26 per cent. over the previous year was recorded. The total sales indicated amounted to 3,882,000 short tons valued at $28,375,000.

The demand for lime ran considerably ahead of the previous year during the first few months of 1937, slowed down after the middle of the year, and was very poor indeed during the last quarter. The decline in the latter half year virtually cancelled the gains during the first half. Business was spotty, some companies reporting much better sales, while others selling to the same industry and even in the same territory were unable to ship as much as they did in 1936.

Lime for agricultural use (392,000 tons valued at $2,586,000) was the only class that showed a substantial increase (16 per cent.) in total sales, although even in this field, many companies reported decreases in output. Notwithstanding an increase of about 10 per cent. in building construction, the quantity of lime reported sold for construction (898,000 tons valued at $7,837,000) increased only one per cent. So-called "chemical" lime (exclusive of dead-burned dolomite)—used in chemical, metallurgical, and other process industries—amounted to 1,984,000 tons valued at $12,762,000, the increase of only 3 per cent. in tonnage being somewhat disappointing in view of the high rate of activity in iron and steel, paper, and a few other lines during a large part of the year. Dead-burned dolomite shipments (608,000 tons valued at $5,190,000) increased only 2 per cent.

Hydrated lime included in the total output amount to 1,237,000 tons valued at $10,205,000, an increase of about one per cent. in quantity and 7 per cent. in value. About one-half of the hydrated lime is used by the building trades, one-third for chemicals, and the remainder for agriculture.

Imports of quicklime during the eleven months amounted to 7,088 short tons valued at $72,042; of hydrated lime to 1,079 tons valued at $12,494, and of dead-burned dolomite to 8,968 short tons valued at $228,364. These figures represent substantial decreases in each class from the imports for the same period in 1936.

A NEW starch producing company, the Villanyer Starkefabrik G.m.b.H. has been formed at Villany, Hungary.

Chemical Matters in Parliament

Unemployment in Heavy Chemical Trade

IN the House of Commons on March 1, Mr. Kelly asked the Minister of Labour the number of men and women employed in the heavy chemical trade in January, 1937, and January, 1938, respectively?

In a written answer Mr. E. Brown said the total number of insured persons classified as belonging to the chemical industry is ascertained for one date only in each year, namely, the beginning of July. The table below gives for the chemicals group and for the chemical industry proper, the estimated numbers of insured men and women, aged 18 to 64, in Great Britain at July, 1936, and July, 1937, and the numbers recorded as unemployed at January 25, 1937, and January 17, 1938. Separate figures for the heavy chemicals industry are not available.

	Men, aged 18-64		Women, aged 16-64	
	Chemicals Group*	Chemical Industry proper	Chemicals Group*	Chemical Industry proper
Estimated numbers insured—				
July, 1936	153,730	74,090	49,320	22,450
July, 1937	160,520	75,490	50,650	24,150
Insured persons recorded as unemployed—				
January 25th, 1937 ..	12,701	6,716	2,495	1,068
January 17th, 1938 ..	11,971	6,101	2,708	1,215

* Including the manufacture of chemicals, explosives, paints, oils, etc.

Colonial Sugar

A variation in the terms of the preference for Colonial sugar was announced by Sir John Simon in another written Parliamentary answer to a question on March 8, by Mr. Palmer, who asked whether the present quota preference system for Colonial sugar will be continued after the end of the financial year 1937-38.

The Chancellor of the Exchequer said that on May 6, 1937, the then Lord President of the Council informed the House that in the event of the International Sugar Agreement coming into operation it was the intention of the Government in the United Kingdom to invite Parliament to stabilise the existing rates of imperial preference for a period of five years similar to that covered by the agreement. He added that the additional colonial preference would also be continued, subject to a minor modification of its terms, on which a further announcement would be made. He was now in a position to announce that the Government propose, on the assumption that the International Sugar Agreement will come finally into force, to agree to a continuance for the period covered by the agreement of the additional colonial preference of 3s. a cwt. on a quota of 360,000 tons subject to the following alterations. First, the price of sugar above which the special preference will be liable to alteration will be 6s. 6d. per cwt. c.i.f., instead of 7s. per cwt. as at present. Secondly, if in consequence of a rise in sugar prices the special preference has to be reduced, the reduction will be applied, not to the special preference rate, but to the amount of tonnage eligible, a reduction of 90,000 tons, or 25 per cent., being made in the quota for each rise of 6d. per cwt. over the price of 6s. 6d.

ONE of the objects of the Turkish Second Five Year Plan is the development of Kutahya as a centre of chemical industry. Rich lignite deposits are available in the vicinity, and a large power station is to be built in the town. With the assistance of the Sumer Bank, several heavy chemical factories (caustic soda, chlorine, fertilisers, etc.) will be erected and the cost of the entire scheme is estimated at £30 million. A rayon factory is already in production at Gemlik and the present annual output of 300 tons is sufficient for home requirements. Cellulose for this factory is being imported pending completion of the cellulose plant at Ismit.

Trade Prospects

Sir Ernest Benn Reviews the Indications of Continuing Prosperity

SIR ERNEST BENN, the chief proprietor of THE CHEMICAL AGE, reviewed trade prospects and appealed for justice for savers in addressing the 97th annual meeting of the members of the United Kingdom Temperance and General Provident Institution in London on Wednesday. Sir Ernest, who is chairman and managing director of the institution, said :—

"All the known factors taken together point towards continuing prosperity. Employment figures reach totals beyond anything thought possible a few years ago. Unemployment figures tend more and more to indicate the growth of a valuable social service rather than unemployment, as the term was formerly understood. We have over three million new houses. Some people talk as if the only economic value of a house was in its building, and forget that every house is the permanent foundation of a continuing trade in all things that make it a home. Budget prospects are better than was generally expected, and nearly all the indices and statistics with which we are satiated provide grounds for optimism. But we cannot assess the unknown factors, such as for instance, the psychological factor. If everyone believes that a slump is coming, and acts accordingly, then undoubtedly a slump will arrive. Attention should, I think, be called in this connection to a curious new phenomenon. There is, I suspect, a risk of a new political technique. Governments are vulnerable, according to the state of trade prevailing during their tenure of office. They may have little or much to do with that state of trade, but they cannot escape blame, nor will they fail to take credit, as the circumstances permit. If in the future it is to be considered the duty of the Opposition, whatever Government is in power, to promote the slump psychology in order to damage that Government, a serious new threat to prosperity will appear upon the scene. Having regard, however, to the quality and experience of our electorate, I cannot think that any such sinister device can possibly benefit those who are foolish enough to adopt it."

Sir Ernest reported that 1937 had taken the institution above the £5,000,000 mark in new business, and continued :—

"It is widely thought that social advancement can be secured by the raising of wages and the increasing of the incomes at the lower end of the income scale. That very natural opinion is only true if it is held as part of a wider view. France and America have each provided us in the recent past with illustrations of the dangers of simple processes such as all-round increases in wages, or wholesale distributions of borrowed money.

The truth is that an increase in income is only good provided that a proper proportion of that income is saved, that is to say that the due relations between capital expenditure and expenditure for consumption are maintained.

If we look at the savings banks, the building societies, the friendly societies, the insurance offices, and at our £5,000,000, there is no doubt that our people, with their traditional wisdom, are doing their utmost to save a full proportion of the higher incomes which better times are placing at their disposal. This is not a matter which the experts can arrange for us. It concerns the breeding and the sound commonsense of the individuals who compose this nation, and from it we can derive a complacency about our security and the future state of trade which is, unfortunately, not available to less happily favoured peoples.

Year by year I have felt it a duty to utter a warning against the forcing of a cheap money policy. I speak for the savers, and I think it is time to speak even more emphatically. We savers have for too long suffered the injustice of a one-sided market, a borrowers' market, forced upon us by artificial means. As savers, we can claim to be at least as valuable to the community as the spenders, and far more valuable than the spendthrifts. I am not speaking on behalf of the money-owners, the wealthy, the capitalists, as those terms have for so long been understood, or misunderstood. I speak for many thousands of hard-working people, tradesmen, clerks, civil servants, schoolmasters, and the like. Those people, and as a class they embrace practically the whole population, are ignored, on their saving side, by the advocates of cheap money.

Sir Ernest said in conclusion that on December 31, 1937, the total sum assured by the policies of the institution, including bonuses, was over £63,000,000. The security for the fulfilment of each of these contracts was over 25 millions of funds, amply sufficient on the most stringent basis of valuation. He submitted a motion for the adoption of the report and accounts, which was seconded by Lord Lothian, supported by Lord Plender, and adopted by the meeting.

Foreign Chemical Notes

Austria

OIL AND PETROL REQUIREMENTS are now covered to the extent of 10 per cent. by home production. In the course of the next two or three years it is hoped to raise the proportion to 25 per cent.

Japan

THE SODIUM FORMATE PLANT of the Edogawa Kogyosho, at Osaka, is now in production with a monthly capacity of 30 tons.

THE OKITA NATURAL GAS CO. has been formed for the purpose of extracting iodine from natural gas. The estimated cost of equipment is 600,000 yen.

Italy

BY A GOVERNMENT DECREE the sale of manna will be centralised in the Provincial Manna Consortium at Palermo, to whom all the producers must deliver their stocks.

A CONCESSION FOR EXPLOITING the Pietratonda antimony mines, near Compagnatico, in the province of Gosseto, has been granted by the government, but the name of the licensee is not disclosed.

Poland

BENZYL ALCOHOL MANUFACTURE has been commenced by the "First Polish Vanillin Works," of Warsaw.

THE GOVERNMENT IS PLANNING to introduce home-produced cranberry extract as a substitute for lemons.

POTASSIUM PERMANGANATE MANUFACTURE has been commenced by the Czenstochau Chemical Works (Zaklady Chemiczne).

CHEMICALLY PURE ZINC FOR LABORATORY USE is now being produced by the Schlesische Zinkbergwerke A.G., of Kattowitz.

PEPSIN IN POWDER FORM, conforming to the Polish Pharmacopœa, is now being made by the R. Barcikovski Chemical Works, of Posen.

SYNTHETIC RUBBER WILL BE MANUFACTURED at a factory now being built at Dembica, near Rzeszow. The new product will be marketed in the autumn under the name of "Keru."

THE LAOKOON CHEMICAL WORKS (Zaklady Chemiczne "Loakoon"), of Lemberg, makers of pharmaceutical and organotherapeutic products, are increasing their capital from 161,000 to 414,000 zloty.

A SERIES OF DYESTUFF INTERMEDIATES is being produced by the Boruta Chemical Co., of Zgierz. Included in the range are *o*-toluidine, *p*-toluidine, diethyl *m*-aminophenol, *o*-dichlorbenzidine, 1-naphthylamine-5-sulphonic acid and 2-naphthylamine-3, 6-disulphonic acid.

Personal Notes

MR. J. DEWAR has been appointed lecturer in chemistry in the United College, St. Andrew's University.

MR. E. R. BOLTON, a member of the Chemical Engineering Committee, has become a Fellow of King's College, London.

THE LATE MR. ROBERT SWAN CORBETT, a director of the Distillers' Finance Corporation, has left estate valued £157,030, with net personalty £106,172.

DR. C. H. DESCH, F.R.S., was elected President of the Institute of Metals for 1938-1939 at the annual general meeting of the Institute on March 8. He has been awarded the Bessemer gold medal of the Iron and Steel Institute for 1938. The presentation will be made at the annual general

meeting of the Iron and Steel Institute on May 4. Dr. Desch has long been distinguished as a teacher of metallurgical chemistry. In 1932 he was appointed to succeed the late Dr. W. Rosenhain, F.R.S., as Superintendent of the Metallurgical Department at the National Physical Laboratory. Since that time he has been in charge of researches which have for their object the production of metals of the highest degree of purity obtainable, for the purposes of research, in particular the metals of the iron group. Under his leadership, methods have also been worked out for estimating, in a satisfactory manner, the oxygen content of steels

THE LATE MR. WILLIAM HENRY LEGAT, of Bolton, founder of W. H. Legat, Ltd., manufacturing chemists, has left estate valued £10,841, with net personalty £10,766.

MR. J. W. WRIGHT, a director of Evans Sons Lescher and Webb, Ltd., has been elected chairman of the Liverpool branch of the Industrial Transport Association.

PROFESSOR G. M. BENNETT has been appointed professor of chemistry at King's College, London. Since 1931 he has been Firth professor of chemistry at Sheffield University.

THE LATE MR. ATHOL JOHN CAPRON, of Westlowe, Hathersage, civil engineer, vice-chairman of Newton Chambers and Co., has left estate valued £28,367, with net personalty £21,971.

MR. E. D. HUGHES, of University College, and MR. W. TAYLOR, of the Sir John Cass Technical Institute, have received the degree of D.Sc. in chemistry from the University of London.

DR. ROBERT HUNTER, Ph.D., has become a director of the Clyde Alloy Steel Co., Ltd., which is the special alloy steel subsidiary of Colvilles, Ltd. He has been chief metallurgist of the company for some years.

MR. ALEXANDER WILLIAMSON, general manager of Steel, Peech and Tozer, Ltd., of Sheffield, and Master Cutler in 1934, has been appointed managing director of William Beardmore and Co., Ltd., forge rolling mills and steel works, Glasgow.

PROFESSOR F. S. KIPPING, formerly head of the Department of Chemistry at Nottingham University College, and Mrs. Kipping, celebrated their golden wedding on March 3. In 1909 Professor Kipping was awarded the Longstaff medal of the Chemical Society.

MR. WALTER PICKARD, head of the buying department of Cadbury Brothers, Ltd., has retired after forty-seven years' service. During the war period, he served on the Raw Cocoa Committee which was formed by the Ministry of Food. He had the distinction of being the employee with the longest service still working at Bournville.

PROFESSOR I. M. HEILBRON, Ph.D. (Leipzig), D.Sc. (Glasgow), F.R.S., Sir Samuel Hall professor of chemistry and director of chemical laboratories at Manchester University, has been appointed to the University chair of organic chemistry, tenable at the Imperial College of Science and Technology, London University.

MR. HUGH ALEXANDER TRESTRAIL, who graduated in metallurgy at Adelaide University in 1932, has received the first award of the Klug medal of the Australasian Institute of Mining and Metallurgy. The medal was founded in honour of the memory of the late Mr. George Charles Klug, for award to students who especially distinguish themselves in their final year in mining and metallurgy at Adelaide.

OBITUARY

MRS. ELIZABETH MARY GILLIAN, wife of Councillor Arthur Gillian, general secretary of the Chemical Workers Union, died in Dulwich Hospital on March 5.

MR. JOHN WOOD, of Coxhoe Hall, Co. Durham, a director of the Weardale Steel, Coal and Coke Co., and of the Hartlepool Gas and Water Co., has died at his home at the age of 71.

MR. F. W. L. MACHENHAUER, a retired research chemist, formerly employed by Joseph Crosfield and Son, Ltd., soap manufacturers, died at Warrington, last week, age 76, following a seizure.

MR. JAMES CONSTANTINE CORT, of Manor House, Ainsworth, managing director of D. Constantine and Son, Ltd., Breightmet bleachworks, Breightmet, near Bolton, Lancashire, died on March 3, age 46. The whole of his business career had been spent in the bleaching industry, and he took over control of the Breightmet works many years ago on the death of his father, Mr. Edmund Cort.

Ten Years Back

From "The Chemical Age," March 10, 1928

For the first time in its history of 70 years the Mill Close lead mine, near Matlock, has ceased production owing to the low price of lead in the market, due to foreign competition.

* * * *

The King will formally open the new eastern wing of the National Museum of Science and Industry, Exhibition Road, South Kensington, at three o'clock on Tuesday afternoon, March 20.

* * * *

Expansion of the Chilean nitrate industry is being planned by the Guggenheim interests at Tocopilla, where buildings to cost four millions sterling are in the course of erection, for the production of half a million tons yearly. Plant for the Caplan-Smith process for utilising low-grade deposits will be installed.

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From Week to Week

TWENTY-FIVE CHEMICAL WORKS at Marseilles, were occupied by stay-in strikers on March 3.

OIL IN COMMERCIAL QUANTITIES is believed to exist near Sarajevo following experimental borings made there by order of the Jugoslav Government.

THE LOCAL CHEMICAL MANUFACTURING INDUSTRY of Runcorn provides work for 140 boys and 72 girls, states the annual report of the Runcorn and District Advisory Committee for Juvenile Employment.

THE RUBBER GROWERS' ASSOCIATION have unanimously approved the provisional revised text, as recommended by the International Rubber Regulation Committee, of the intergovernmental agreement to regulate production and export.

THE GERMAN OIL MILLS WHALING Consortium has acquired the whaling fleet of eight vessels of the Viking Corporation. The first consignment of whale oil of the now expiring season has been landed in Hamburg from a Japanese tanker; it amounts to 8,000 tons.

THE JAPANESE MINISTRY OF COMMERCE AND INDUSTRY has decided to place sales of petrol and oil under licence with the object of reducing consumption by 20 per cent., according to Tokyo advices. Only the holders of tickets issued by the authorities will be allowed to sell.

THE INSTITUTION OF MECHANICAL ENGINEERS states that the proceedings of the general discussion on "Lubrication and Lubricants" (October, 1937), will be available towards the middle of March in two bound volumes, comprising 1,200 pages, price 25s. For this discussion 136 papers were received.

IMPERIAL CHEMICAL INDUSTRIES, LTD., have issued a pattern card giving full details of the application and fastness of Brenthol combinations on silk. Patterns of forty typical Brenthol-Brentamine base combinations are given, side by side with make-up details of the appropriate Brenthol and developing baths.

A GOVERNMENT BILL HAS BEEN INTRODUCED authorising the borrowing of £5,000,000 to establish a steel production plant in New Zealand. An annual output of 85,000 tons of finished steel may be expected. The Dominion, it is estimated, would then require 70,000 to 75,000 tons from Great Britain annually.

THE STAND OF IMPERIAL CHEMICAL INDUSTRIES, LTD., at the forthcoming Laundry Exhibition will show alkalies, bleaching agents and textile assistants and solvents, and will explain their use in the washing and bleaching of white goods and coloured goods, and the washing of woollens, silks and rayon.

IMPORT DUTIES ADVISORY COMMITTEE, has issued Import Duties (Drawback) (No. 4) Order, 1938, further amending the scheme of drawback in respect of soya beans used in the manufacture of soya bean flour. The Order extends the drawback to flours to which in manufacture it is the practice to add a limited quantity of bleaching materials.

THE BRITISH PLASTICS YEAR BOOK FOR 1938 has just been published by the Plastics Press, Ltd. It contains sections relating to names and addresses, proprietary names, materials, plant and equipment, manufactured products, trade associations, who's who in the plastics industry, and data. There are 596 pages. In the "Who's Who" section there are about twice as many pages as last year. As development in cast resins has made considerable progress during the past year, some details of the process and methods of manipulation are included to assist readers in the use of these materials.

THE BRAUN-KOHLEN BENZINE CO. is placing on the market a loan of 120,000,000 reichsmarks to increase its facilities for the production of synthetic petrol. The money will be used for the extension of three factories and the construction of a new one. Two of the factories produced in the past year 320,000 tons of petrol. This year it is hoped to produce 420,000 tons. The Braun-Kohlen Benzin Co., better known in Germany as the Brabag, was founded in 1935 by the leading companies engaged in mining brown coal, from which petrol is produced. Its production last year was about 320,000 tons, and it is expected to produce 425,000 tons of petrol in 1938.

A PUBLIC DISCUSSION ON THE LIGHTING PROVISIONS embodied in the New Factory Act will be held under the auspices of the Industrial Lighting Section of the Illuminating Engineering Society, at the Home Office Industrial Museum, Horseferry Road, Westminster, London, S.W.1, on March 29, at 6.30 p.m. Speakers representing the points of view of the employer, the employee, the lighting expert and the administration will take part, including Mr. D. Gluckstein of J. Lyons and Company, Mr. H. N. Winbolt, Assistant Secretary of the Safety-First Association, Dr. S. English, President of the Illuminating Engineering Society, and Mr. E. W. Murray of the Home Office Industrial Museum. Tickets may be obtained free on application to the Secretary, Mr. C. W. M. Phillips, The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.

THE PROMPT ACTION OF A WATCHMAN prevented a serious outbreak of fire at the lead colour works of Alex. Fergusson & Co., Ltd., Maryhill, Glasgow, on March 8.

WORKERS AT THE EMPIRE EXHIBITION at Glasgow, who have been on strike for a week have decided by a majority to accept the employers' offer of an increase in wages of 2d. an hour.

THE FIRST DUTCH ALUMINIUM COMPANY has been formed at Amsterdam with a capital of £110,000. It will use an electrolytic process. In the past Holland has depended on imports for supplies of aluminium metal.

COINCIDENT WITH THE ANNOUNCEMENT in Brussels of some definite agreement between the Steel Cartel and American exporters it is learned that some of the smaller American steel companies have joined, or are prepared to join the Steel Export Association.

THE BOARD OF TRADE have amended List H, issued in 1921 under the Safeguarding of Industries Act, 1921, defining the chemicals to be taken as falling under the general description in the schedule to that Act, by deleting therefrom chromium potassium sulphate.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BULLOCK THORNHILL AND SONS, LTD., Macclesfield, bleachers, dyers, etc. (M., 12/3/38.) Feb. 28, charge, to Westminster Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Chester Road Dyeworks, Macclesfield, etc.

CHEMICAL MILLING CO., LTD., London, E.C. (M., 12/3/38.) Feb. 24, series of £1,000 debentures, present issues £650 and £150; general charge. * Nil. Nov. 19, 1936.

NORTH BRITISH ALUMINIUM CO., LTD., London, E.C. (M., 12/3/38.) Feb. 24, disposition, supplemental to Trust Deed dated Sept. 12, 1934; charged on Dalchreggan, Fort William. * Nil. April 14, 1937.

County Court Judgment

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

DAWSON, A., AND CO. (firm), 41 Joseph Street, Bradford, oil and chemical merchants. (C.C., 12/3/38.) £14 7s. 11d. January 27.

Receiverships

FEARNLEY BROS. (1920), LTD. (164,964.) Dyers, finishers, bleachers, etc. Spring Dye Works, Shipley. S. Laycock, of Barclays Bank Chambers, North Street, Keighley, was appointed Receiver on March 2, 1938, under powers contained in instrument dated March 12, 1920.

Voluntary Liquidation

MIDLOTHIAN CHEMICAL CO., LTD., 377 Dalmarnock Road, Glasgow.—The statutory meeting of creditors was held recently at Glasgow, when it was stated that the shareholders had nominated Mr. G. B. McVean as liquidator. No statement of affairs was submitted, but according to a balance sheet as at June 8, 1936, there was a debit balance of £2,424. The company was formed in 1926, with a nominal capital of £1,000, of which £605 had been issued and was fully paid up. It was stated that from time to time Mr. J. Wallace, the managing director, had advanced sums of money to the company and he was now a creditor for £1,500. The creditors decided to confirm the voluntary liquidation of the company, with Mr. McVean as liquidator, and a committee of inspection was also appointed.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

MANUFACTURE OF CEMENTS.—J. S. Dunn, V. Lefebure, and Imperial Chemical Industries, Ltd. 5506.

MANUFACTURE OF LEAD CHROMATE PIGMENTS.—E. I. du Pont de Nemours and Co. (United States, Feb. 20, '37.) 5480.

HEAT TREATMENT OF METALS.—Electric Resistance Furnace Co., Ltd., and W. J. Millar. 5259.

MANUFACTURE OF CARBON BLACK.—D. Gardner. 5087.

TREATMENT OF BERYLLIUM ORES.—D. Gardner. 5088.

TREATMENT OF MAGNESIUM, ETC.—D. Gardner. (Oct. 31, '36.) 5691.

PRODUCTION, ETC., OF BERYLLIUM, ETC.—W. V. Gilbert. 5633.

MANUFACTURE OF AGENTS FOR IMPROVING TEXTILES.—W. W. Groves (I. G. Farbenindustrie.) 4958.

MANUFACTURE OF POLYMERISATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) (Sept. 28, '36.) 5264.

MANUFACTURE OF ALKYLENE-SULPHONIC ACID ESTERS, ETC.—W. W. Groves (I. G. Farbenindustrie.) 5735.

DYESTUFFS MIXTURES.—W. W. Groves (I. G. Farbenindustrie.) 5736.

MANUFACTURE OF TETRAHYDROPYRIMIDINES.—W. W. Groves (I. G. Farbenindustrie.) 5737.

PROCESS FOR IMPROVING TEXTILES.—W. W. Groves (I. G. Farbenindustrie.) 5752.

SYNTHETIC RESIN COMPOSITIONS.—A. Hill, and Imperial Chemical Industries, Ltd. 5792.

PURIFYING PHYSIOLOGICALLY ACTIVE LIPOIDS.—I. G. Farbenindustrie. (Germany, Feb. 22, '37.) 5551.

MANUFACTURE OF AZO-DYESTUFFS.—I. G. Farbenindustrie. (Germany, March 27, '37.) 5557.

COMPOSITIONS OF CELLULOSE ESTERS, ETC.—I. G. Farbenindustrie. (Germany, Feb. 22, '37.) 5581.

PROCESS FOR IMPROVING PULVERULENT FUELS, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 4969.

PURIFICATION OF GASES.—G. W. Johnson (I. G. Farbenindustrie.) 5131.

MANUFACTURE, ETC., OF SULPHAMIDES OF CARBOXYLIC ACID IMIDES.—G. W. Johnson (I. G. Farbenindustrie.) 5235.

MANUFACTURE, ETC., OF CARBOXYLIC ACID CHLORIDES, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 5236.

RECOVERY OF CARBON BLACK.—G. W. Johnson (I. G. Farbenindustrie.) 5420.

MANUFACTURE OF CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie). 5421.

DEHYDROGENATION OF ALIPHATIC COMPOUNDS, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 5578.

BLEACHING OF SULPHURIC ACID.—J. P. Leemans, and Soc. Generale Metallurgique de Hoboken. 5455.

PRODUCTION OF TITANIUM CARBIDES.—J. P. Leemans and Soc. Generale Metallurgique de Hoboken. 5611.

MANUFACTURE OF CEMENTS.—V. Lefebure, J. S. Dunn, N. E. Wallace, and Imperial Chemical Industries, Ltd. 5511.

MANUFACTURE OF SOAP, ETC.—Lever Bros., and Unilever, Ltd., R. Thomas, and H. B. Oakley. 5687.

PRODUCTION OF GASEOUS MIXTURES containing carbon monoxide and hydrogen suitable for conversion into hydrocarbons.—London Testing Laboratory, Ltd., and M. Steinschlaeger. 4986.

PRODUCTION OF MIXTURES OF HYDROCARBONS.—London Testing Laboratory, Ltd., and M. Steinschlaeger. 5191.

DIAMIDINE DERIVATIVES.—May and Baker, Ltd., A. J. Ewins, and H. J. Barber. 5606.

PREPARATION OF SULPHONAMIDE DERIVATIVES.—May and Baker, Ltd., A. J. Ewins, and G. Newbery. 5605.

PRESERVATION OF RUBBER.—Monsanto Chemical Co. (United States, Feb. 25, '37.) 5444.

PRECIPITATING ZINC SULPHIDE.—Non Ferrous Metal Products, Ltd. (United States, April 1, '37.) 5306.

HYDROGEN SULPHIDE RECOVERY.—Non Ferrous Metal Products, Ltd. (United States, April 1, '37.) 5307.

PLANT HORMONES.—S. H. Oakeshott, W. A. Sexton, and Imperial Chemical Industries, Ltd. 5793.

METAL ALLOYS.—A. R. Powell, E. R. Box, and Johnson and Matthey and Co., Ltd. 5133.

EXTRACTION OF EARTH OXIDES from minerals.—A. R. Powell and Johnson, Matthey and Co., Ltd. 5132.

MANUFACTURE OF SULPHUR-CONTAINING HETEROCYCLIC COMPOUNDS.—F. P. Reed, A. Robertson, W. A. Sexton, and Imperial Chemical Industries, Ltd. 5207.

PREPARATION OF PAINT, ETC.—Resinous Products and Chemical Co. (United States, March 6, '37.) 5101.

ALKYD RESINS.—Resinous Products and Chemical Co. (United States, March 6, '37.) 5102.

PROCESS FOR RENDERING CELLULOSIC MATERIAL WATER-REPELLANT. R. J. W. Reynolds, E. E. Walker, and Imperial Chemical Industries, Ltd. (Aug. 19, '37.) 4933.

PROCESS FOR RECOVERING ACETYLENE FROM ACETYLENE-CONTAINING GASES.—Ruhrchemie, A.-G. (Germany, Feb. 20, '37.) 5326.

ORGANIC OXIDATION PRODUCTS of fatty matter, etc.—J. R. Short Milling Co. (United States, Feb. 23, '37.) 5742.

PREPARATION OF SALTS OF CELLULOSE ETHER CARBOXYLIC ACIDS.—F. Sichel, A.-G. (Germany, March 1, '37.) 5584.

REDUCTION OF CALCIUM SULPHATE.—Soc. des Produits Azotés. (France, Feb. 24, '37.) 5582.

AGE-HARDENING OF ALLOYS.—R. A. Stephen. 5296.

PRODUCTION OF CONDENSATION PRODUCTS.—H. J. Tattersall, and Imperial Chemical Industries, Ltd. 5610.

REMOVING SULPHUR COMPOUNDS from gases freed of hydrogen sulphide.—A. A. Thornton (Kohle und Eisenforschung Ges.). 5292.

PRODUCTION OF LEAD TITANATE PIGMENTS.—Titan Co., Inc. (United States, Feb. 23, '37.) 5619.

SPLITTING OF HYDROCARBONS.—W. W. Triggs (Bayerische Stickstoff-Werke, A.-G.). 5699.

MANUFACTURE OF TETRACHLORETHYLENE.—Dr. A. Wacker Ges. für Elektrochemische Industrie Ges. (Germany, June 19, '37.) 4960.

MANUFACTURE OF CEMENTS.—N. E. Wallace, V. Lefebure, and Imperial Chemical Industries, Ltd. 5512.

ANTIOXIDANTS.—C. F. Winaus. 5099.

Specifications Open to Public Inspection

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Aug. 26, 1936. 15322/37.

MANUFACTURE OF ALKYLATED AMINO-KETONES of the aromatic series.—I. G. Farbenindustrie. Aug. 26, 1936. 17597/37.

PROCESS FOR EXTRACTING VALUABLE SUBSTANCES FROM SYNTHETIC PROCESS GASES.—Carbo-Norit-Union Verwaltungs-Ges. Aug. 24, 1936. 18489/37.

PRODUCTION OF ENAMEL.—I. Kreidl. Aug. 27, 1936. 21304/37.

PROCESS OF PRODUCING SURFACE-ACTIVE PRODUCTS.—Deutsche Houghton Fabrik Kommanditges. Aug. 24, 1936. 23199/37.

MANUFACTURE OF TITANIUM PIGMENTS.—Titan Co., Inc. Aug. 26, 1936. 23230/37.

MANUFACTURE OF SEMI-PYROPHORIC COMPOUNDS.—O. F. Wyss. Aug. 25, 1936. 23243/37.

ZINC ALLOYS and articles made thereof.—National Smelting Co., Ltd. Aug. 26, 1936. 23360/37.

PROCESS FOR THE MANUFACTURE OF WASHING, cleansing, wetting, and emulsifying agents.—Naamlooze Vennootschap Chemische Fabriek Servo, and M. D. Rozenbroek. Aug. 26, 1936. 23459/37.

PROCESS AND DEVICE FOR THE DISTILLATION OF GLYCERINE and other materials containing impurities.—J. Baudot. Aug. 27, 1936. 23571/37.

Specifications Accepted with Dates of Application

PRODUCTION OF CONCENTRATED SULPHUR DIOXIDE.—Metallges, A.-G. July 5, 1935. 480,519.

COPPER-LEAD ALLOYS, and methods of and apparatus for producing same.—H. J. Ness. (Dec. 28, 1935.) 480,523.

PREPARATION OF SYNTHETIC RESINS from hydroformed naphthas. Standard Oil Development Co. (Oct. 16, 1935.) 480,435.

DISTILLATION OF RESINS and employment of products obtained therefrom.—R. F. Powell. July 16, 1936. 480,436.

POLYMERISATION OF DRYING-OILS.—H. I. Waterman, Vlodrop, C. Van, and Imperial Chemical Industries, Ltd. July 22, 1936. 480,677.

PLASTICISERS FOR VINYL RESINS.—G. W. Johnson (I. G. Farbenindustrie.) July 24, 1936. 480,592.

MANUFACTURE OF DYESTUFF DERIVATIVES.—Soc. of Chemical Industry in Basle. (Aug. 17, 1935. (Samples furnished.) 480,358.

CRACKING OF HYDROCARBON MIXTURES.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 21, 1936. 480,442.

MANUFACTURE OF CELLULOSE ARTIFICIAL WOOL.—W. W. Groves (I. G. Farbenindustrie.) Aug. 22, 1936. 480,597.

PROCESS FOR THE MANUFACTURE OF WATER-INSOLUBLE DYESTUFFS. A. Carpmael (I. G. Farbenindustrie.) Aug. 22, 1936. 480,539.

MANUFACTURE OF DISAZO-DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) Aug. 24, 1936. 480,601.

MANUFACTURE OF VAT DYESTUFFS.—I. G. Farbenindustrie. Aug. 22, 1935. 480,602.

PROVISION OF HYDROCARBONS with distinctive colourings.—A. Carpmael (I. G. Farbenindustrie.) Aug 24, 1936. 480,604.

MANUFACTURE OF SYNTHETIC RESIN PRODUCTS.—Bakelite, Ltd. Aug. 24, 1936. 480,607.

ANTHRAQUINONE DYESTUFFS.—R. J. Loveluck, and Imperial Chemical Industries, Ltd. Aug. 24, 1936. 480,745.

CARBONISATION OF PITCH.—W. W. Groves (Dr. C. Otto and Co., Ges.). Sept. 15, 1937. 480,652.

PRODUCTION OF ALLOYS OF ALUMINIUM WITH CALCIUM.—I. G. Farbenindustrie. Jan. 29, 1937. 480,658.

Chemical and Allied Stocks and Shares

THE main factor influencing the stock and share markets has again been the very small amount of business passing in markets generally. There is little inducement for more active conditions to develop as there is an increasing tendency to await the Budget proposals and also the outcome of the moves in the European political situation. Sentiment has also been influenced by the very conservative dividend policy indicated by the latest results of important companies. The latter applies more particularly to concerns in the iron, steel and allied trades, but has been taken as an indication that rather more cautious views are now held in regard to industrial prospects during 1938-39.

On balance for the week, there has been a further all-round movement to lower levels, and shares of companies identified with the chemical and kindred trades have reflected the surrounding trend of markets. It is generally agreed, however, that the recent declines have been out of all proportion to the volume of selling and that they arise primarily from the absence of demand. Considerable interest again attached to Imperial Chemical ordinary units. As compared with a week ago, they have declined further from 30s. 9d. to 28s. 9d., largely as a result of surrounding market conditions. The reaction is, however, attributed in part to differing views as to the full implication of the administrative changes recently announced by the company. Consequently the annual meeting, which is expected to be held next month, is awaited with more than usual interest. The market is anticipating that the dividend announcement will appear at the end of the month or early in April. Cooper McDougall and Robertson were a steady feature at 31s. 3d. on the past year's results and the raising of the dividend from 8½ per cent. to 9 per cent., but the shares continued to be held firmly and the amount of business was probably not sufficient to test the price to any extent. Fison, Packard and Prentice ordinary at 33s. 9d., and B. Laporte at 92s. were also well maintained, but there were other instances where very little business was reported. There was a firmer tendency in British Oil and Cake Mills preferred ordinary at 46s. and also in the ordinary shares of United Premier Oil and Cake at 7s. 9d. on expectations that the forthcoming results of these companies are likely to show that profits have been fairly well maintained. Lever and Unilever at 37s. 6d. were lower, in common with most leading industrial securities, although the market remains hopeful of a rather larger dividend for the past year. British Drug Houses were steady at 23s. 9d., but had an inactive appearance; they are invariably held firmly in view of the company's favourable dividend record over a long period of years. Sangers at 22s. 3d. were fairly well maintained. Although a larger capital ranks, some market men remain hopeful the dividend may again be brought up to 25 per cent., on which basis a good yield is offered at the current price. Boots Pure Drug have declined from 45s. 9d. to 44s. 9d. at the time of writing, while Distillers are lower at 96s. 6d. Reckitt and Sons ordinary were fairly well maintained on the repetition of the total distribution at 22½ per cent., while Cerebos at £8⅝ was another share which was relatively little changed.

British Oxygen have moved down from 76s. 3d. to 72s. 6d., while Murex at 80s., Turner and Newall at 77s. 3d. and International Nickel at $48¼ were among other usually active shares which have been affected considerably by the reactionary trend of markets. British Plaster Board at 27s. are within 1s. 6d. of the price ruling a week ago. Associated Portland Cement have gone back from 86s. to 81s., but are now "ex" the dividend, as are British Portland Cement, which show a reaction to 82s. 6d. Pinchin Johnson have not been assisted by market expectations that the dividend will be maintained at 20 per cent. on the larger capital, and at 34s. show a loss of 1s. on balance. International Paint have lost part of their recent improvement. Indestructible Paint were steady at 81s. 3d., following the announcement of the raising of the dividend from 22½ per cent. to 25 per cent.

Iron, steel and similar shares were affected by the various dividend announcements that have come to hand in the past few days, which show that, although profits have increased, dividend payments are more conservative than was expected in the market. Baldwins are 6s. 10½d. compared with 7s. 9d. a week ago, while Dorman Long have reacted to 28s., and Consett Iron to 9s. 1½d. Oil shares were at a lower level, but, as in other sections of the Stock Exchange, no very heavy selling has been reported.

Forthcoming Events

London.

March 14.—Royal Society of Arts. John Street, Adelphi, W.C.2. 8 p.m. (Cantor Lecture) Colin J. Smithells, "Gases and Metals" (Lecture III).

University College. Gower Street, W.C.1. 5 p.m. Dr. J. F. Danielli, "Surface Chemistry and Biology."

Institution of the Rubber Industry. Royal Empire Society. Northumberland Avenue, W.C.2. B. D. Porritt, "The History of the Plantation Rubber Industry."

March 15.—British Association of Refrigeration. Institute of Marine Engineers, 85-88 Minories, E.C.3. 6.30 p.m. Report of the Research Committee on Temperature and Carbon Dioxide Measuring Instruments."

March 16.—Institute of Chemistry (London and South-Eastern Counties Section) London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. Professor J. B. S. Haldane, "Air Raids and Air-Raid Protection."

Society for the Study of Alchemy and Early Chemistry. University College, Gower Street, W.C.1. 8 p.m. Dr. R. Campbell Thompson, "Assyrian Chemistry of the Seventh Century, B.C."

March 17.—The Chemical Society. Burlington House, Piccadilly, W.1. 8 p.m. Joint discussion with the Physical Society will be opened by Professor G. Ingle Finch on "Electron Diffraction and Surface Structure."

Association of Scientific Workers. University College, Gower Street, W.C.1. 8.15 p.m. Dr. F. S. Sinnatt, "Fuel Research by the D.S.I.R."

Institute of Fuel. Junior Institution of Engineers, 39 Victoria Street, S.W.1. 6 p.m. G. W. J. Bradley and Dr. G. E. Foxwell, "The Development of By-Product Coking."

March 18.—Royal Institution of Great Britain, 21 Albermarle Street, W.1. 9 p.m. Sir William Bragg, "Ice."

Institute of Chemistry, 30 Russell Square, W.C.1. 8 p.m. Dr. R. Alan Morton, "The Practical Aspects of Absorption Spectro-photometry."

March 19.—Royal Institution of Great Britain, 21 Albermarle Street, W.1. 3 p.m. W. L. Bragg, "Some Scientific Problems of Industry; Iron and Steel."

Birmingham.

March 14.—The Institute of the Plastics Industry. James Watt Memorial Institute. 8 p.m. R. P. Cartwright, "The Behaviour of Plastics under Various Service Conditions."

Edinburgh.

March 14.—Institute of Chemistry (Edinburgh and East of Scotland Section). Professor N. V. Sidgwick, "Multiple Links."

Hull.

March 15.—Hull Chemical and Engineering Society. University Technical College, Park Street. 7.45 p.m.

Liverpool.

March 18.—Society of Chemical Industry. University, Liverpool. 6 p.m. Annual Meeting. Brinley Jones, "Lead for use in Chemical Plant."

Manchester.

March 14.—The Institute of the Plastics Industry. Engineers' Club, 17 Albert Square. 7.15 p.m. Prize Papers.

March 18.—Society of Dyers and Colourists. Literary and Philosophical Society, 36 George Street. 7 p.m. A representative of Messrs. Courtaulds, "Dyeing of Fibro."

March 21.—Institution of the Rubber Industry. Constitutional Club, St. Ann's Street. Papers, including J. G. Robinson, "Notes on the Analysis of Organic Accelerators," and F. S. Roberts, "The Tendency in Latex Research."

Sheffield.

March 22.—Chemical Engineering Group. Joint Meeting with the Yorkshire Section and the Sheffield Metallurgical Club. J. H. G. Monypenny, "Corrosion-Resisting Iron and Steels for Chemical Engineering."

Books Received

Solvents. By Thos. H. Durrans. 4th Edition. London: Chapman and Hall, Ltd. Pp. 238. 15s.

Dipole Moments. R. J. W. Le Fèvre. London: Methuen and Co., Ltd. Pp. 110. 3s. 6d.

Notes on Qualitative Organic Analysis. F. R. Storrie. London: J. M. Dent and Sons, Ltd. Pp. 68. 2s. 3d

Chemie in Deutschland. Edited by Claus Ungewitter, assisted by Dr. W. Greiling, Dr. Koeck E. Barth von Wehrenalp. Berlin: Junker and Dünnhaupt Verlag. Pp. 143.

Organic Reagents for Metals and for Certain Acid Radicals. By the Staff of the Research Laboratory of Hopkin and Williams, Ltd. 3rd Edition. London: Hopkin and Williams, Ltd. Pp. 156.

Weekly Prices of British Chemical Products

BUSINESS on the chemical markets during the past week has been decidedly slow, dealers in most departments reporting dull conditions and an absence of fresh buying orders. At the consuming end, however, deliveries under existing commitments appear to be going forward on a satisfactory scale. There are no important price alterations to record for general chemicals, rubber chemicals and wood distillation products and values continue steady as quoted. Quiet conditions continue to prevail in the coal tar section, and with buyers and sellers marking time there appears to be little prospect of an immediate return to activity. Prices for nearly all products have an easier tendency and rates are mostly nominal at last week's quotations.

MANCHESTER.—There has been little change in the general position on the Manchester chemical market during the past week. Both among light and heavy chemicals the price position is mostly steady and although since last report not a big weight of new business has been placed locally, a fair aggregate quantity is being delivered against contract specifications, the movement of textile chemicals being about on the scale of recent weeks. With regard to the tar products except in one or two directions there has been little improvement in fresh sales, and, generally speaking, business during the past week has been on rather quiet lines. Values of the by-products, however, appear to be more stable than they have been of late, and an early expansion of buying is looked for in some quarters.

Price Changes

Falls: Lead Acetate, white and brown (Manchester); Naphthalene, purified crystals; refined (Manchester).

GLASGOW.—Business in general chemicals has again been on a limited scale during the week, both for home trade and export. Prices, however, continue very steady at about previous figures, with no important changes to report.

General Chemicals

ACETONE.—**£45 to £47 per ton.**

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 2s. 6d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising, £19 per ton, ex wharf.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—**£68 per ton.**

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d. station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9½d. per lb., less 2½%; d/d U.K.

CHROMIUM OXIDE.—11d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£21 7s. 6d. per ton, less 2% in casks. MANCHESTER: £19 5s. per ton f.o.b. SCOTLAND: £19 5s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £4 12s. 6d. to £5 12s. 6d. per cwt. according to quantity; in drums, £4 5s. 0d. to £4 17s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—**Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.**

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £31 10s.; brown, £1 per ton less. MANCHESTER: White, £32; brown, £31.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £31 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.) 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £54 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH CAUSTIC.—Solid, £35 5s. to £36 15s. per ton for 2-ton lots ex store; broken, £42 per ton. MANCHESTER: £39.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 10s. per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 5s. 6d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 1s.

POTASSIUM PRUSSIATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 10s. 6d. per ton.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £14 per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4¼d. per lb. net d/d U.K. with rebates for contracts. MANCHESTER:

SODIUM CHROMATE.—4¼d. per lb. d/d U.K.

4d. per lb. GLASGOW: 4¼d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £15 to £16 per ton delivered per ton lots.

SODIUM PRUSSIATE.—½d. per lb. for ton lots. GLASGOW: 5d. to 5¾d. ex store. MANCHESTER: 4½d. to 5d.

SODIUM SILICATE.—£9 10s. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—6s. 6d. to 6s. 9d. per lb.

CARBON BLACK.—4d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5½d. per lb.; dark 4d. to 4½d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—30%, £17 to £17 15s. per ton.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1938.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1938.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9¼d. to 9¾d. per gal.; standard motor, 1s. 2¾d. to 1s. 3¼d.; 90%, 1s. 3¾d. to 1s. 4¼d.; pure, 1s. 7¾d. to 1s. 8¼d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4¼d.

CARBOLIC ACID.—Crystals, 7¾d. to 8¼d. per lb., small quantities would be dearer; Crude, 60's, 3s. 3d. to 3s. 6d.; dehydrated, 4s. 4¼d. to 4s. 7¼d. per gal. MANCHESTER: Crystals, 7¾d. to 8d. per lb. f.o.b. in drums; crude, 3s. to 3s. 6d. per gal.

CREOSOTE.—Home trade, 6d. to 6¼d. per gal., f.o.r. makers' works; exports, 6¾d. to 6¾d. per gal., according to grade. MANCHESTER: 4¼d. to 5¼d. GLASGOW: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5¼d.; lower sp. gr. oils, 5¾d. to 6¼d.

CRESYLIC ACID.—97/99%, 3s. to 3s. 3d.; 99/100%, 4s. to 4s. 6d. per gal., according to specification; Pale, 99/100%, 3s. 8¼d. to 3s. 11¼d.; Dark, 95%, 2s. 7¼d. to 2s. 10¼d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 3s. 3d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1¼d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6¼d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £6 10s. to £7 10s. per ton; purified crystals, £14 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 10s. to £7 per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £16 per ton f.o.b.

PITCH.—Medium, soft, 34s. to 36s. per ton, f.o.b. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. GLASGOW: 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 13s. 6d. to 15s. per gal.; 90/160%, 10s. to 13s. 3d. per gal.; 90/180%, 3s. 3d. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 12s. 6d. to 14s. per gal.

TOLUOL.—90%, 1s. 10d. per gal.; pure, 2s. 2d. GLASGOW: 90%, 120, 1s. 10d. to 2s. 1d. per gal.

XYLOL.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d. to 2s. 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £7 10s. to £8 per ton; grey, £9 10s. to £10. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

METHYL ACETONE.—40.50%, £35 to £40 per ton.

WOOD CREOSOTE.—Unrefined, 4d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—3s. 3d. to 3s. 6d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

WOOD TAR.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—8½d. per lb.

DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 9¼d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d. per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—10½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—11½d. per lb., in 8/10-cwt. drums, drums extra.

p-TOLUIDINE.—2s. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 8d. per lb., 100%.

Company News

Paripan, Ltd., manufacturers of enamels, in their report for 1937, show net trading profit £12,553 (£10,116). To tax and N.D.C., £2,942 (£2,182); to general reserve, £1,175 (£1,020); to bad debts reserve, £825 (£1,000); final ordinary dividend of 15 per cent., less tax, making 20 per cent. (same); additional remuneration to directors, £163; forward, £6,224.

Brown Baileys Steel Works have declared an interim dividend on the ordinary shares of 5 per cent., free of tax, on account of the year ending July 31 next. Last year the company resumed dividends with a first and final payment of 10 per cent., tax free, for 1936-37, the previous dividend to which was 7½ per cent., actual, for twenty months ended July 31, 1921.

Lancashire Steel Corporation has made a further increase in the distribution on the "A" and "B" ordinary shares on account of 1937. The directors have declared a final dividend of 4½ per cent., making with the interim a total of 7 per cent. actual, less tax, compared with 5 per cent. for the previous year and 4 per cent. for 1935. The final payment on the 5½ per cent. non-cumulative redeemable second preference shares is also announced.

Associated Dyers and Cleaners, Ltd., which last April carried through a capital reconstruction scheme, announces a net profit of £40,622 for 1937, compared with £17,263 in the previous year. The ordinary shares receive a dividend of 6¾ per cent., less tax, and the deferred shares 6 per cent., less tax. The previous ordinary dividend paid on the old capital was 6 per cent. Issued capital is £475,000, consisting of £450,000 in ordinary 10s. shares and £25,000 in deferred 1s. shares.

North British Rubber Co. announce the payment of dividend arrears for three and a-half years to June 30, 1933, on the £125,000 5 per cent. second cumulative preference share capital. Three years' arrears of dividend to December 31, 1936, were paid last year on the £100,000 5 per cent. first cumulative preference share capital, thus wiping out arrears on this class of capital. In addition to the preference capital, the company has £500,000 in ordinary shares, making a total issued capital of £725,000.

Monsanto Chemicals, Ltd., after providing £53,341 (£41,883) for tax and N.D.C. and £37,770 (£30,729) for depreciation, show that profit for 1937 was £132,802 (£115,721); add amount written back in respect of taxation and other provisions not now required £28,000 (£1,059); special development expenditure during year written off £12,028 (nil); special appropriation to depreciation and obsolescence reserve £10,000 (nil); interim ordinary dividend paid for 1937, free of tax, absorbs £100,000 (nil); £219,969 (£197,764) forward.

Associated Clay Industries, Ltd., earned a profit of £52,402 in 1937, which is a slightly higher annual rate than the figure of £36,613 for the previous nine months. The ordinary distribution of 10 per cent., against 6 per cent., already announced, takes £10,523, and tax and N.D.C. require £11,543. After writing off £6,124 for development expenditure and transferring £10,000 to reserve, £7,191 is carried forward, compared with £2,823 brought in. It is proposed to increase the authorised capital from £350,000 to £700,000 by the creation of an additional 175,000 cumulative £1 preference shares and 175,000 £1 ordinary shares.

Courtaulds, Ltd., show total profits of £3,430,204. This figure is struck after excise duty and an alteration in income-tax methods, and is £285,283 higher than the 1936 total revised on a comparable basis. The 1938 profit includes " dividends on the company's American investment, which in the aggregate exceed the profits earned by that investment and its interest for the year 1937." After deducting directors' and other fees, and £1,029,760, against £821,389, for income-tax and national defence contribution, the profit is £2,373,892, compared with a revised figure of £2,296,458 for 1936. The amount earned for dividend after allowing for pensions reserves, etc., is up from £2,196,458 to £2,273,892. The preference dividend takes £300,000, against £305,000. A final dividend of 7 per cent. is to be paid, making with the interim a total distribution on the ordinary stock of 10½ per cent., less tax, for 1937. In the previous year an interim of 2½ per cent. was paid free of tax, and a final of 7 per cent., subject to tax. The total payment for 1936, less tax, was equivalent to £10 5s. 7d. per cent. The carry-forward is up from £212,749 to £296,641.

The International Nickel Co. of Canada, Ltd., has declared the regular quarterly dividend on the 7 per cent. cumulative preferred stock, payable on May 2.

British Xylonite Co., Ltd., announce a profit for 1937 of £48,633 (£32,795) with a final dividend of 7½ per cent. on ordinary shares, making 10 per cent., less tax (17½ per cent.); forward, £92,757 (£74,124.)

Indestructible Paint Co. is increasing its ordinary dividend for 1937. The directors recommend a final of 17½ per cent., making 25 per cent., less tax, against a final of 16¼ per cent., making 22½ per cent. in 1936. Profit, before charging N.D.C., was £54,725, against £50,176 for 1936.

Dominion Tar and Chemical Co., announce a net profit for 1937 of $628,097 ($384,167); to sinking fund reserves $8,023; dividends on preference stocks $293,784; transfer to capital account $25,175; discount of debentures $162,500; balance at credit of profit and loss $1,000,454 ($861,839).

Celanese Corporation of America has declared a dividend of $1.75 on the 7 per cent. cumulative prior preferred and $1.53 on the 7 per cent. cumulative first participating preferred, covering the period to December 31, both payable April 1 to holders on record on March 18.

Canadian Celanese, Ltd., announces a quarterly dividend on the common stock of 25 cents per share, for 1937, four quarterly payments of 40 cents per share were made. In addition to the dividend for the current quarter on the 7 per cent. preferred stock, a participating dividend of 54 cents per share is declared, being amount accrued to December 31 last. A participating dividend of 69 cents per share was paid at this time last year.

Reckitt and Sons, Ltd., manufacturers of starch, metal polishes, etc., has maintained the distribution for 1937 at the same level as for the past six years—22½ per cent., less tax—with a final dividend of 6¼ per cent. and a bonus of 1¼ per cent. The dividend and bonus are payable, less tax at 4s. 9d., after allowing for Dominion tax relief, to all shareholders registered on April 14. The payment will be fixed as soon as possible after the annual general meeting to be held on May 6.

Cooper, McDougall and Robertson, Ltd., manufacturers of sheep and cattle dip, etc., are recommending at the forthcoming annual general meeting, on March 24, a final dividend of 6¼ per cent. actual, on the ordinary shares, making with the interim 9 per cent. actual, less tax, for the year ended September 30 last. For the preceding twelve months the holders of the £82,411 ordinary capital received 8¼ per cent., which was 1 per cent. more than for 1934-35. Issued capital totals £1,571,886, of which £747,475 is in 7 per cent. cumulative preference shares. The report adds that the decreases in the values of freehold and leasehold land and buildings, and plant and machinery, and in the value of stock in trade are due to the sale of the Yalding factory and stocks as the result of the formation of a new company—Plant Protection, Ltd.—to control the company's insecticide trade.

Associated Portland Cement Manufacturers, Ltd., and its subsidiary, **British Portland Cement Manufacturers, Ltd.,** are both maintaining their 1937 ordinary dividends at 22½ per cent., with final payments of 15 per cent. Associated Portland Co. is repeating its depreciation provision at £417,150, while £83,389 is allowed for the debenture stock sinking funds. In the previous year £87,500 was placed to contingencies reserve and trade investments were written down by £10,000. The carry-forward is increased by £9,228 to £205,893. From the figures announced it would appear that net profits have declined from £1,017,117 to £934,228. British Portland Cement Manufacturers, with profit on trading of £818,319, shows a small increase as compared with 1936.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Canada.—A well-established firm of agents at Montreal wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of edible gelatine for the Province of Quebec. (Ref. No. 156.)

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders, to be presented in South Africa by April 11, 1938, for the supply of one 42,000-gallon, one 20,000-gallon and two 10,000-gallon pressed steel tanks. (Ref. T.Y. 18734/38.)

Egypt.—H.M. Consul-General at Alexandria reports that the Municipality of Alexandria is calling for tenders for the supply and delivery of quantities of pharmaceutical products. Tenders should be addressed to the Director-General of the Municipality, Alexandria, by whom they will be received up to noon on April 20, 1938. (Ref. T. 18638/38.)

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the Rand Water Board is calling for tenders, to be presented in London by March 25, 1938, for the supply of quantities of sluice and reflux valves and tapers, valves for scours, and air valves for the Vereeniging-Zwartkopies pipe line and Vereeniging pumping station. (Ref. T.Y. 18742/38.)

Egypt.—A firm in Egypt wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of non-ferrous metals (e.g., tin and lead in ingots, copper plates, zinc plates, phosphor bronze and white metal (Ref. No. 161.)